For List of Council and Officers, Conditions of Admission to the Fellowship of the Society, and Society Notices, see pages ii., iv., vi., and viii.

The Geographical Journal.

Authors are alone responsible for their respective statements. It is desirable that communications should be type-written. In MS. communications all new or unfamiliar geographical names should be written in imitation of Roman type. All communications for the Editor should be addressed to Kensington Gore, London, S.W.

CONTENTS—JUNE.

PAGE

Antarctica and Some of its Problems. By Prof. T. W. Edgeworth David, C.M.G., F.R.S. (with 3 Sketch-maps and 5 Diagrammatic Sections) 605
The Geographical Results of the Nigeria-Kamerun Boundary Demarcation Commission of 1912–13. By Captain W. V. Nugent, R.A. (with 4 Plates and Map) 630
Physiographical Notes. By G. W. Lamplugh, F.R.S., F.G.S. 651
The Lake System of Westralia. By Prof. J. W. Gregory, F.R.S. (with Map) 656
The Indo-Russian Triangulation Connection. By Lieut. Kenneth Mason, R.E. (with 2 Plates and Sketch-map) 664
Dr. F. de Filippi's Asiatic Expedition 672
The Yale University and National Geographic Society Peruvian Expedition. By Hiram Bingham, Director 676
Recent Volcanic Earthquakes. By Charles Davison, Sc.D., F.G.S. 678
Reviews:—
EUROPE—Hannibal Once More. A Great Volcano. ASIA—The Geography of Madras. Mongolia in Transition. AFRICA—Bornu. Dry-farming in South Africa. Somaliland. Uganda. The Congo State. Egypt and the Sudan. AMERICA. POLAR REGIONS—De Quervain's Crossing of Greenland. MATHEMATICAL AND PHYSICAL GEOGRAPHY—Mountain Structure . 679
The Monthly Record 690

THE SOCIETY
The Awards for 1914
EUROPE
The Chiltern Wind-gaps
ASIA
Recent Fall in the Level of the Caspian
Note on the name Saltoro
Deflection of the Plumb-line in Northern India
The Railway Connection between India and Ceylon
Mr. C. Boden Kloss in Malaysia
Earthquakes in the Philippines
AMERICA
The Georgian Bay Ship Canal
New Canadian Trans-continental Railway
Geography in the United States
Mr. Roosevelt's Journey in South America
AUSTRALASIA AND PACIFIC ISLANDS
Murray River Storage Scheme
Mr. A. F. Wollaston's Map of his Explorations in Dutch New Guinea
Melanesian Migrations
MATHEMATICAL AND PHYSICAL GEOGRAPHY
Contemporaneity of the Glacial and Pluvial Periods
GENERAL
Geographical Distribution of the Wild Sheep
Honour to Miss Semple
Livingstone College
The Third International Congress of Tropical Agriculture

Obituary—The Duke of Argyll, K.T., etc. Eduard Suess. By Prof. J. W. Gregory, F.R.S. Robert L. Reid. Emile Gentil 700
Correspondence—Is the Earth drying up? By Colonel S. G. Burrard, R.E. The Bearing of the Facts revealed by Antarctic Research upon the Problems of the Ice Age. By Marsden Manson. Mr. Carruthers' Maps of Mongolia and Dzungaria. By Prof. W. W. Obrucheff and Douglas Carruthers 705
Meetings of the Royal Geographical Society, Session 1913–1914 709
Geographical Literature of the Month 710
New Maps 723

MAPS.

Sketch-maps illustrating "Antarctica and Some of its Problems" . . . 607, 613, 618
Sketch-map of the Indo-Russian Triangulation Connection 667
Map to illustrate the paper on the Nigeria-Kamerun Boundary Commission of 1912–13 730
Sketch-map to illustrate the paper on the Lake System of Westralia 730

This Journal is obtainable retail in LONDON from Edward Stanford, Ltd., 12, 13, & 14, Long Acre, W.C.; G. Philip & Son, Ltd., 32, Fleet Street, E.C.; and Sifton, Praed & Co., Ltd., 67, St. James's Street, S.W., or from any bookseller in the United Kingdom. Also from the following foreign firms: Barrère, PARIS; Artaria & Co., VIENNA; L. Friederichsen & Co., HAMBURG; D. Reimer, BERLIN; F. A. Brockhaus, LEIPZIG; International News Co., NEW YORK.

ROYAL GEOGRAPHICAL SOCIETY.

PATRON.

HIS MAJESTY THE KING.

VICE-PATRON.

HONORARY PRESIDENT.

Field Marshal H.R.H. the DUKE OF CONNAUGHT, K.G., G.C.M.G.

COUNCIL.

(ELECTED MAY 18, 1914.)

President—DOUGLAS W. FRESHFIELD.

Vice-Presidents.

Right Hon. Earl CURZON OF KEDLESTON, G.C.S.I., G.C.I.E., etc.
Major LEONARD DARWIN, D.Sc.
Colonel R. C. HELLARD, C.B., R.E.
Colonel Sir THOMAS HUNGERFORD HOLDICH, K.C.M.G., K.C.I.E., C.B.
Sir EVERARD F. IM THURN, K.C.M.G., C.B.
The Lord LAMINGTON, G.C.M.G., G.C.I.E.

Treasurer—EDWARD L. SOMERS COCKS.

Trustees—Lord BELHAVEN AND STENTON; H. YATES THOMPSON.

Honorary Secretaries—Colonel Sir D. A. JOHNSTON, K.C.M.G., C.B.
Sir FRANCIS E. YOUNGHUSBAND, K.C.I.E.

Foreign Secretary—Right Hon. Sir G. D. TAUBMAN GOLDIE, K.C.M.G., F.R.S., D.C.L.

Members of Council.

Admiral Sir LEWIS BEAUMONT, G.C.B., K.C.M.G.
CHARLES W. CAMPBELL, C.M.G.
DOUGLAS CARRUTHERS.
Sir W. MARTIN CONWAY.
HENRY NEWTON DICKSON, D.Sc.
H. WILSON FOX.
Professor STANLEY GARDINER, F.R.S.
Professor EDMUND J. GARWOOD, F.R.S.
The Lord GLENCONNER.
ALBERT GRAY, K.C.
Dr. ALFRED C. HADDON, F.R.S.
Colonel W. C. HEDLEY, R.E.
DAVID G. HOGARTH.
G. WM. LAMPLUGH, F.R.S.
Captain H. G. LYONS, D.Sc., F.R.S.
Right Hon. Sir CLAUDE M. MACDONALD, G.C.M.G., G.C.V.O.
Sir ALFRED SHARPE, K.C.M.G., C.B.
Colonel Sir J. R. DUNLOP SMITH, K.C.S.I., C.I.E.
Colonel P. MOLESWORTH SYKES, C.M.G., C.I.E.
Colonel Sir HENRY TROTTER, K.C.M.G., C.B.
Colonel Sir CHARLES M. WATSON, K.C.M.G., C.B.

Secretary, and Editor of Publications—J. SCOTT KELTIE, LL.D.

Assistant Secretary—ARTHUR R. HINKS, M.A., F.R.S.

Librarian.	Map Curator.	Chief Clerk.
EDWARD HEAWOOD, M.A.	EDWARD A. REEVES, F.R.A.S.	S. J. EVIS.

Bankers—Messrs. COCKS, BIDDULPH and Co., 43, Charing Cross.

Candidates for admission into the Society must be proposed and seconded by Fellows, and it is necessary that the description and residence of such Candidates should be clearly stated on their Certificates.

It is provided by Chapter V., § 1, of the Bye-Laws, that—

"Every Fellow shall, on election, be required to pay £5 as entrance fee, and £3 as annual "subscription for the current year, and thereafter a yearly subscription of £3, due on the 1st January "of each year; or he may compound either at entrance by one payment of £45, or at any subsequent "period on the following scale, provided that there shall be at the time no arrears due by him to "the Society:—

Fellows of	10 years'	standing and under	15	... £30
	15 "	" "	20	... £24
	20 "	" and over		... £18 15s.

"No Fellow shall be entitled to vote or to enjoy any privilege of the Society while in arrear. "Honorary and Honorary Corresponding Members and Fellows elected under Chapter III., Paragraph "5, are not required to make any payments."

All Subscriptions are payable in advance, on the 1st of January in each year.

The privileges of a Fellow include admission (with one Friend) to all ordinary Meetings of the Society, and the use of the Library and Map-room. Each Fellow is also entitled to receive a copy of all the Society's Periodical Publications.

Copies of the Year Book, Regulations, and Candidates' Certificates may be had on application at the Society's Office, Kensington Gore, London, S.W.

HOTEL METROPOLE LONDON

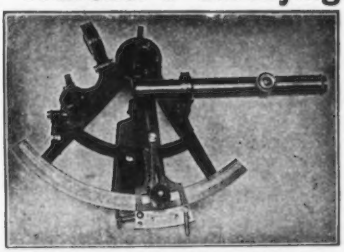
Of world-wide reputation. Conveniently situated in Northumberland Avenue, close to Houses of Parliament, theatres, fashionable quarter, and chief places of interest. Numerous luxuriously furnished self-contained suites of rooms. Magnificent lounge hall. Telephone in every bedroom.

Telegrams "*Metropole, London.*"
Telephone 8130 *Gerrard* (20 *lines*).

GORDON HOTELS, LTD.

THE ONLY ENGLISH-MADE
QUININE SULPHATE IS HOWARDS'
(Stratford, London).
QUININE TABLETS FOR TRAVELLERS.
Unsurpassed for accuracy of dose—a most important item, too often neglected.
Specify 'HOWARDS.'

CARY PORTER, LTD. **Traveller's Surveying Instruments.**
7, PALL MALL, LONDON, S.W.
Established 1765.
BY SPECIAL APPOINTMENT TO THE
Admiralty, War Office, India Office, Ordnance Survey, Crown Agents for the Colonies, Royal Naval and Military Colleges, and other Government Departments. German, Russian, Japanese, and other Foreign Governments.
FACTORY—FINSBURY PARK, N.



Theodolites, Sextants, Artificial Horizons, Telescopes, Barometers, Plane Tables, Binoculars, Compasses, etc.
Only maker of Reeves' Patent Endless Tangents and Artificial Horizons.
GRAND PRIZE AND GOLD MEDAL—FRANCO-BRITISH EXHIBITION, 1908.

Telephone: 4965 City.
"GEOGRAPHIA" LTD
33 STRAND, LONDON, W.C.
Telegrams: "Geografo, London."
will be pleased to quote reduced rates to Fellows for drawing and printing Special MAPS, CHARTS or PLANS.
All Styles of Mounting at Lowest Rates.
New 2 miles to 1 inch Road Maps of England & Wales are just ready. Most comprehensive and accurate.

DELICIOUS COFFEE.
RED WHITE & BLUE
For Breakfast & after Dinner.

ROYAL GEOGRAPHICAL SOCIETY.

NOTICES.*

Evening Meeting in the Queen's Hall on Tuesday, June 9.—There will be a meeting on this date at 8.45 p.m., in the Queen's Hall, when Dr. Douglas Mawson will lecture on The Australian Antarctic Expedition. Fellows' tickets are available as at an ordinary meeting. No extra tickets will be issued.

Evening Meeting in the Theatre, Burlington Gardens, on June 16, at 8.30 p.m.—The Hon. Theodore Roosevelt will give an account of his expedition in Brazil. Owing to limited accommodation, admission is restricted to Fellows only by Fellow's Ticket. No extra tickets will be issued.

Evening Meeting in June in the Theatre, Burlington Gardens.—Monday, June 22, at 8.45 p.m. Exploration in the Unknown Brahmaputra Region and on the North-Eastern Frontier of India. By Captain F. M. Bailey.

Afternoon Meeting in the Map Room.—Wednesday, June 17, at 5 p.m.—Final Report on the Rivers Investigation. By Dr. A. Strahan, F.R.S., and others.

Conversazione.—The Annual Conversazione will be held in the Society's House, Kensington Gore, on Tuesday, June 23, from 9 to 12 p.m. The President will receive from 9 to 10. Tickets will be sent to Fellows in the United Kingdom, each for a Fellow and friend. Extra tickets may be obtained by application to the Chief Clerk, price 5*s.* each up to Noon on Monday, June 22, after which the charge will be 7*s.* 6*d.*

The Society's House.—The House is open from 10 a.m. to 6 p.m., on Saturdays to 1 p.m., and to 8.15 p.m. on ordinary meeting nights.

Any Fellow desiring to have notice of the subjects of papers to be read at the Society's Meetings forwarded to him, can receive such notices by post on payment in advance to the Chief Clerk, at Kensington Gore, S.W., of 2*s.* per session.

* See also pp. vi., viii., and x.

PROTECTS FROM INFECTION.

Prescribed by the Medical Profession for 50 Years.

This is the wrapper of

WRIGHT'S

The ORIGINAL and ONLY GENUINE

COAL TAR SOAP

Mental or Physical Fatigue

When brain or body is weary the digestive powers are weakened and distaste for ordinary food is often experienced. Under such circumstances the 'Allenburys' DIET is especially valuable. It is pleasant to take, easily digested and assimilated and speedily restorative. Thus it helps the system to recover tone and vigour. MADE IN A MINUTE. Add boiling water only.

Large Sample will be sent for 3d. Stamps.

Of Chemists 1/6 and 3/- per tin

The 'Allenburys' DIET

Allen & Hanburys Ltd., Lombard St., London

D.52

Experience has taught that no expedition may be considered to be completely and thoroughly equipped without a plentiful supply of

BOVRIL

KEEPS GOOD FOR ANY LENGTH OF TIME.

PROVISIONS AND OUTFIT.

GRIFFITHS, McALISTER & Co.,

EXPORT PROVISION MERCHANTS, ETC.,

29-31, Manesty's Lane, Liverpool. 14, Billiter St., London, E.C.

Suppliers of all kinds of Provisions, Camp Equipment, Medical Stores, Wines, Spirits, and Mineral Waters, &c., for Exploring and Mining Expeditions; also for private use abroad.

All Goods suitably packed for Hot and Cold Climates, and made up in loads suitable for all modes of Transport.

Suppliers to Lieut. Shackleton's Antarctic Expedition, 1907–1909; also Captain Scott's Antarctic Expedition, 1910, and Dr. Mawson's Australasian-Antarctic Expedition, 1911.

CONTRACTORS TO THE CROWN AGENTS FOR THE COLONIES.

Telegraphic Addresses: "COOMASSIE," LIVERPOOL. "APPEASABLE," LONDON.

Codes used: A, B, C, 4th and 5th Editions and Lieber's.

ESTABLISHED 1880.

Antarctic

The **remainder** of the Stamps issued to the late Capt. Scott, and actually taken by him to the Antarctic, are now being officially offered to the public.

Souvenirs

The fixed prices are **5/-** for the 1d. and **25/-** for the ½d. (less than 500 remain).

A copy of the guarantee signed by Commander Evans is given with each stamp.

The Antarctic Secretary,
89, Farringdon St.,
London, E.C.

All communications respecting Advertisements in the

"GEOGRAPHICAL JOURNAL"

to be sent to

G. STREET & CO., LTD.,

8, SERLE STREET, LINCOLN'S INN, W.C.

CLARKSON'S

SECOND-HAND OPTICAL MART,

338, HIGH HOLBORN, W.C.

(Opposite Gray's Inn Road).

Sextants, Theodolites, Surveyors' Instruments, Prism Binoculars, Telescopes, and other Second-hand Optical Instruments by the best makers.

Telephone: 2149, HOLBORN.

NOTICE.

PHOTOGRAPHS.

ROYAL GEOGRAPHICAL SOCIETY.

It would greatly add to the value of the Collection of Photographs which has been established in the Map Room of the Royal Geographical Society, if all the Fellows who have taken photographs during their travels would forward copies of them to the Map Curator, by whom they would be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

THE **BLUE FUNNEL** LINE

To SOUTH AFRICA and AUSTRALIA.

Superior Saloon Accommodation—Only One Class.

Large New Steamers of over 14,000 tons.

Fares: SOUTH AFRICA, £30. AUSTRALIA, £45.

Apply to—

ALFRED HOLT & CO., India Buildings, Liverpool.

DEUTZ & GELDERMANN

"GOLD LACK" CHAMPAGNE.

LA GRANDE MARQUE

OLD LIQUEUR BRANDY.

VINTAGES 1858 and 1865.

By Royal Warrant to H.M. King George V.

"Charles Heidsieck"

CHAMPAGNE.

GABARDINE

BURBERRY WEATHERPROOF KIT

The Burberry
Proof against all moisture, self-ventilating and airylight.

GABARDINE, woven by Burberrys from fine and light yarns, meets the requirements of the explorer and sportsman in the most masterful manner.

REMARKABLE POWERS of withstanding wear, combined with a surface impregnable by thorns, makes Gabardine invaluable for rough work in out-of-the-way parts of the world.

BURBERRY-PROOFED, Gabardine obviates the ill-effects of exposure to heavy rain and mists, whilst neither extremes of heat or cold can affect its protective powers.

PROOFED WITHOUT RUBBER or any like deleterious matter, Gabardine is airylight, air-free and hygienically perfect.

DENSELY WOVEN and non-conductive, Gabardine serves alike to keep out the heat by day and the cold at night.

Gabardine Suit
The ideal outrig for rough wear.

"GABARDINE IN PEACE AND WAR."
A handbook which deals practically with equipment in every part of the world. Illustrated with some 50 full-page pictures, including portraits of distinguished users of Gabardine.
A Copy post free on request.

BURBERRYS HAYMARKET, LONDON
8 & 10, Boulevard Malesherbes, PARIS.

BAIRA GAZELLE, SOMALILAND.

EDWARD GERRARD & SONS

Natural History Studios,

61, College Place, London, N.W.

SKINS **Dressed.**
NATURAL HISTORY SPECIMENS **of all kinds mounted for Scientific or Ornamental purposes.**

NATURALISTS & TAXIDERMISTS.

Write for Illustrated Price Lists.

BRITISH COLUMBIA

One of the Most Beautiful Countries in the Empire.

Magnificent Scenery. Splendid Inland Waters. A Land of Fruit and Flowers. The Sportsman's Paradise. An Ideal Climate

To the Traveller, Mountaineer, and Sportsman British Columbia offers innumerable attractions.

BRITISH COLUMBIA presents the Tourist with an array of varied and magnificent scenery, and offers to the Climber the fascination of the Rocky Mountain Range, whilst for Sportsmen and Country Gentlemen it is an ideal one for residence. No country peopled by white men surpasses British Columbia in opportunity for the hunter and angler.

The fame of the Province as a hunting ground has spread abroad, and every year sees an increasing number of big game hunters from Europe, who are invariably delighted with their success in securing trophies.

Maps, Photographs, and Specimens of Game, Fish, &c., may be seen at the London Agency, where the leading British Columbia newspapers are also filed. Full information on application to J. H. TURNER, Agent-General for B.C., Salisbury House, Finsbury Circus, London, E.C.

NOTICE.

INSTRUCTION FOR INTENDING TRAVELLERS.

Under the authority of the Council of the R.G.S.

Arrangements have been made for the instruction of intending travellers in the following subjects:—

Surveying and Mapping, including the fixing of positions by Astronomical Observations. By Mr. E. A. REEVES, F.R.A.S., Map Curator of the Society.

Geology, including practical training in the field. By arrangement with the Director-General of the Geological Survey.

Botany. By arrangement with the Director, Royal Gardens, Kew.

Zoology. Natural History Museum, South Kensington.

Anthropological Measurements. Under the superintendence of the Anthropological Institute.

Photography. By Mr. JOHN THOMSON, Author of 'Photographic Illustrations of China and its People,' and other works.

Meteorology. By Dr. H. R. MILL.

Outfit and Health. Dr. CHARLES F. HARFORD, Secretary of the Travellers' Health Bureau.

The Lessons are given on days and at hours arranged between the Instructor and the pupil. Tickets for the lessons, at 2*s.* 6*d.* for each hour's lesson, must be previously procured at the Offices of the Society.

UNDER the name of "Worcestershire Sauce" there is as wide a range of difference as there is under the name of "wine."

The quality of a mixture is not improved in the least by putting it into a bottle that resembles **LEA & PERRINS'**, and by giving it a label that imitates the appearance of Lea & Perrins'.

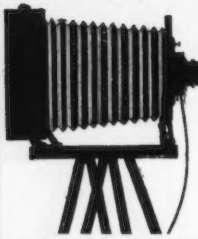
And still there are people who conclude that if the bottle has the appearance of Lea & Perrins', the fluid inside is like Lea & Perrins' Sauce.

The white writing on the Red Label:

Lea & Perrins

indicates the Original and Genuine

WORCESTERSHIRE SAUCE.



SECOND-HAND

CAMERAS

Hand Cameras
Field Cameras
Studio Cameras
Telephoto Lenses
Binoculars at

25 TO 50% OFF List Prices.

Catalogue post free.

SANDS, HUNTER & Co.,

37 Bedford Street, STRAND, W.C.

ESTABLISHED 1874.

WATKINS & DONCASTER

— *Naturalists,* —

36 STRAND, LONDON, W.C.

Keep in Stock every Description of

Apparatus, Cabinets, Books, and Specimens

for Collectors of

Bird's Eggs, Butterflies, & Moths, &c., &c.

Catalogue sent post free to any address.

THOS. COOK & SON'S

PROGRAMME

NO. 104

"Summer Holidays, Where to Go and How to Travel"

Contains Nearly

300 SPECIMEN TOURS, AT HOME AND ABROAD

AT DIFFERENT FARES, BY DIFFERENT METHODS

Free on Application

COOK'S INTERNATIONAL TRAVEL TICKET

THOSE who desire to travel independently will find these tickets invaluable. Each Ticket is printed in English and the language of the country, carries special luggage facilities, in many instances saves money, and entitles the holder to the services of Cook's Interpreters at the principal stations and seaports.

THOS. COOK & SON, Ludgate Circus, LONDON,
or any Branch Office

FRIEZES, HOMESPUNS, TWEEDS, FLANNELS.

Irish. Scotch. Welsh.

For Exploration, Travel, Countrywear, Sport.

These old-fashioned and natural cloths of sterling British make, from native wools, with which the name of **W. BILL** has been intimately associated for over a quarter of a century, are to be had in **great abundance**, as heretofore, from the **WAREHOUSE**—

31 & 29, GT. PORTLAND ST., W.

For comfort, hard wear, and protection from coldest weather the heavy types are unsurpassed. The medium cannot be beaten for all-round country and colonial wear. Whilst the light, tough, hard-spun, undyed, open-weave Flannels are the very things for tropical garments.

Inspection invited; or if impossible, apply for patterns.

For further particulars *vide* "WHITAKER," page iii.; POST OFFICE GUIDE; "DAILY MAIL YEAR BOOK"; "TIMES" (Weekly Edition); "WHO'S WHO"; "HAZELL'S ANNUAL"; "A B C GUIDE," etc., etc.

W. BILL, Woollen Merchant, London, W.
(Branch: 93, NEW BOND ST.)

T. & C. Address: "SELFHELP, LONDON." Estd. over 60 years. Tel.: "GERRARD, 8303."

ROYAL GEOGRAPHICAL SOCIETY.

THE SOCIETY'S PUBLICATIONS.

THE GEOGRAPHICAL JOURNAL. Issued Monthly. Delivered free to all Fellows; price to Non-Fellows, 2s.

GENERAL INDEX TO THE FIRST 20 VOLUMES OF THE GEOGRAPHICAL JOURNAL, 1893–1902. 660 pages, double columns. Price, to Fellows, 6s. 6d. net; to Non-Fellows, 10s. 6d.

JOURNAL OF THE ROYAL GEOGRAPHICAL SOCIETY (OLD SERIES), 1830–1880. 50 volumes, 8vo. Price, to Non-Fellows, £1 per vol. net; to Fellows, 15s. per vol.

PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY (OLD SERIES), 1855-1878. 22 volumes, 8vo. In parts, to Non-Fellows, 1s.; to Fellows, 9d. per part.

PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY (NEW SERIES), consists of 14 volumes, extending from 1879 to 1892. 18s. per vol.; the series now offered for £6.

SUPPLEMENTARY PAPERS.
Containing a large number of Memoirs and Narratives of considerable length, besides several valuable Bibliographies; over 30 Maps and numerous Illustrations. Sold for half price, £2 for the four volumes.

HINTS TO TRAVELLERS.—The ninth revised edition, edited, under a Committee of the Council, by E. Reeves, F.R.A.S., Map Curator and Instructor to the Society. Price 15s. net; to Fellows, at the House of the Society, 10s.

TRIGONOMETRY—PLANE AND SPHERICAL. Specially arranged for the use of Students attending the Royal Geographical Society's course of Instruction. By E. A. Reeves, F.R.A.S. Price 5s. net.

HINTS ON OUTFIT FOR TRAVELLERS IN TROPICAL COUNTRIES. By Charles Forbes Harford, M.A., M.D. Second edition. Price 1s. net.

CATALOGUE OF THE LIBRARY OF THE R.G.S. Edited by Dr. H. R. Mill. Price, to Fellows, 2s. 6d. net; to Non-Fellows, 5s.

THE YEAR-BOOK OF THE SOCIETY. Issued annually. Price, to Non-Fellows, 2s. 6d.; Fellows, 1s.

SYLLABUSES OF INSTRUCTION IN GEOGRAPHY. I. In Elementary Schools. II. In Secondary Schools. Single copies gratis on application at Kensington Gore, S.W.

MAPS AND MAP-MAKING. By E. A. Reeves. Numerous Illustrations. Price, to Fellows, 6s. net; to non-Fellows, 8s. net.

THE FIFTY YEARS' WORK OF THE ROYAL GEOGRAPHICAL SOCIETY. By Sir Clements R. Markham, K.C.B., F.R.S., President. 255 pp. Price, to Non-Fellows, 5s. net; to Fellows, 2s. 6d. net.

THE LANDS OF CAZEMBE. LACERDA'S JOURNEY TO CAZEMBE IN 1798. Translated and annotated by Captain R. F. Burton. 271 pp., with Map. Also Journey of the Pombeiros, P. J. Baptista, and Amaro José, across Africa from Angola to Tette on the Zambese. Translated by B. A. Beadle. And a *Résumé* of the Journey of MM. Monteiro and Gamitto. By Dr. C. T. Beke. Price, to Non-Fellows, 5s. net; to Fellows, 2s. 6d. net.

THE TOPOGRAPHY OF THE BATTLE OF PLATÆA. By G. B. Grundy, B.A. Price, bound in half-calf, to Non-Fellows, 5s. net; to Fellows, 2s. 6d. net.

NOTES ON THE KURIL ISLANDS. By Captain H. J. Snow. 8vo, 88 pp., with two large Charts, revised by Captain Snow. Price, in boards, to Non-Fellows, 4s. net; to Fellows, 2s. net.

EASTERN PERSIAN IRAK. By General A. Houtum-Schindler. 8vo, 182 pp., with Map. Price, to Non-Fellows, 5s. net; to Fellows, 3s. net.

A JOURNEY ON THE UPPER MEKONG, SIAM. By H. Warington Smyth. Sixty Illustrations and three Maps. Price, to Non-Fellows, 7s. 6d. net; to Fellows, 4s. net.

BIBLIOGRAPHY OF ALGERIA, FROM THE EXPEDITION OF CHARLES V. IN 1511 TO 1887. By Sir R. L. Playfair. Price, to Non-Fellows, 7s. 6d.; Fellows, 5s. net. [net.

EDUCATIONAL REPORTS. By Dr. J. Scott Keltie. Price, to Non-Fellows, 5s.; to Fellows, 2s. 6d.

SUPPLEMENT TO THE BIBLIOGRAPHY OF ALGERIA, FROM THE EARLIEST TIME TO 1895. By Sir Lambert Playfair, K.C.M.G. Price, to Non-Fellows, 5s. net; to Fellows, 2s. 6d. net.

MAP OF THE KARAKORAM HIMALAYAS. In two sheets, with text. By Sir W. Martin Conway, M.A. Price, to Non-Fellows, 5s. net; to Fellows, 2s. 6d. net.

SURVEYING AND EXPLORING IN SIAM. By James McCarthy. Large Maps of Siam and many Illustrations. 236 pp. 8vo. Price, to Non-Fellows, 10s. 6d. net; to Fellows, 6s. 6d. net.

THE DISTRIBUTION OF RAINFALL OVER THE LAND. By Dr. A. J. Herbertson. Price, to Non-Fellows, 5s. net; to Fellows, 2s. 6d. net.

ON THE RESULTS OF A DEEP-SEA SOUNDING EXPEDITION IN THE NORTH ATLANTIC DURING THE SUMMER OF 1899. By R. S. Peake, M.Inst.C.E. With Notes on Temperature, Deep-Sea Deposits, &c. By Sir John Murray, K.C.B., F.R.S. Price, to Non-Fellows, 5s. net; to Fellows, 2s. 6d. net.

ARCTIC PAPERS FOR THE EXPEDITION OF 1875. A selection of Papers on Arctic Geography and Ethnology. Reprinted and presented to the Arctic Expedition of 1875, by the President, Council, and Fellows of the Royal Geographical Society. Price, to Non-Fellows, 7s. 6d. net; to Fellows, 5s. net.

THE ANTARCTIC MANUAL, FOR THE USE OF THE EXPEDITION OF 1901. Edited by George Murray, F.R.S. 602 pp. royal 8vo. Price, to Non-Fellows, 15s. net; to Fellows, 10s. net.

JOURNEY TO LHASA AND CENTRAL TIBET. By Sarat Chandra Das, C.I.E. Edited by the Hon. W. W. Rockhill. Maps and Illustrations. 285 pp. 8vo. Price, bound in cloth, to Non-Fellows, 10s. 6d. net; to Fellows, 7s. net.

NEW MAP OF THE RIVER CONGO, in Ten Sections on Five Sheets. Scale 1 : 500,000 (8 miles = 1 inch). By the Rev. George Grenfell. In small portfolio, with Memorandum. Price, to Non-Fellows, 10s. net; to Fellows, 6s. net.

ON RECENT CONTRIBUTIONS TO OUR KNOWLEDGE OF THE FLOOR OF THE NORTH ATLANTIC OCEAN. By Sir John Murray, K.C.B., F.R.S., and R. E. Peake, M.Inst.C.E. Price, to Non-Fellows, 5s. net; to Fellows, 2s. 6d. net.

AN EXPEDITION INTO THE CENTRAL TIAN-SHAN MOUNTAINS. By Dr. Gottfried Merzbacher. Price, to Non-Fellows, 12s. net; to Fellows, 9s. net.

MAP OF TIBET. New edition, 1906. Price, to Fellows, 3s. net; to Non-Fellows, 5s. net.

GEOGRAPHICAL DISTRIBUTION OF VEGETATION IN SOMERSET. By Dr. C. E. Moss. Price, to Fellows, 2s. 6d. net; to Non-Fellows, 5s. net.

BIBLIOGRAPHY OF TOPOGRAPHICAL AND GEOLOGICAL WORKS ON THE PHLEGRÆAN FIELDS. By R. T. Günther. Price, to Fellows, paper covers, 2s. 6d., boards, 3s. net; to Non-Fellows, paper covers, 5s., stiff boards, 6s. net.

NATIONAL ANTARCTIC EXPEDITION, 1901–4. Charts of the Expedition, with Memoir by Lieut. G. F. A. Mulock, R.N. Price, to Non-Fellows, 12s. 6d. net; to Fellows, 9s. net.

MOUNTAIN PANORAMAS FROM THE PAMIRS AND KWEN LUN. With Introduction and Descriptions by Dr. M. Aurel Stein. Price, to Non-Fellows, £1 net; to Fellows, 14s. net.

BATHYMETRICAL SURVEY OF THE FRESHWATER LOCHS OF SCOTLAND. Under the direction of Sir John Murray, K.C.B., F.R.S., and Laurence Pullar, F.R.S.E. Maps and Illustrations. Price, to Fellows, 15s.; to Non-Fellows, 21s. net.

RESEARCHES IN PTOLEMY'S GEOGRAPHY OF EASTERN ASIA. By Colonel G. E. Gerini. 970 pages, with Maps. Price 15s. net; to Fellows, 12s.

NEW MAP OF EASTERN TURKEY-IN-ASIA. Scale of 1 : 2,000,000 (32 miles to an inch), with accompanying text, in case. Price to Fellows, unmounted, 5s. net, mounted, 6s. 6d. net; to non-Fellows, unmounted, 8s. 6d. net, mounted, 10s. Special Edition, with ancient names in red. Price, to Fellows, unmounted, 6s. net, mounted 7s. 6d.; to non-Fellows, unmounted, 9s. 6d. net, mounted, 11s.

MACMILLAN'S NEW BOOKS

51st ISSUE. 1914.

The Statesman's Year-Book.

A Statistical and Historical Annual of the States of the World for the year 1914. Edited by J. Scott Keltie, LL.D., Secretary of the Royal Geographical Society. Revised after Official Returns. With Maps. Crown 8vo. 10*s.* 6*d. net.*

The Daily News.—"As the vade-mecum companion of every one who wishes to write or even read intelligently about public affairs, abroad as well as at home, it has long ago reached the stage at which the only word for its services is 'indispensable.'"

The Wilds of Maoriland.

By James Mackintosh Bell, M.A., Ph.D., Fellow of the Geological Society, &c. &c. With Eight Plates in Colour, many other Illustrations in Black and White, and several Maps. 8vo, 15*s.*

The Quaternary Ice Age.

By W. B. Wright, of the Geological Survey of Ireland. Illustrated. 8vo, 17*s. net.*

Marriage Ceremonies in Morocco.

By Edward Westermarck, Ph.D., LL.D., Martin White Professor of Sociology in the University of London, Author of "The History of Human Marriage," etc. 8vo, 12*s. net.*

The Spectator.—"To all serious students of anthropology and primitive ideas it must be an indispensable supplement to the author's classical work on marriage."

MACMILLAN & CO., Ltd., LONDON.

LEGACIES would be a GREAT BOON

TO THE

Great Northern Central Hospital

(Commonly known as the Great Northern Hospital),

HOLLOWAY, LONDON, N.

No Reserves Available. Annual Expenditure £20,000

Over 24,000 In- and Out-Patients treated every year.

THE HOSPITAL IS DEPENDENT FOR ONE FIFTH OF ITS INCOME ON LEGACIES.

GILBERT G. PANTER, Secretary.

BROWN & ROWLEY

WATLING STREET, CITY,

Printers,

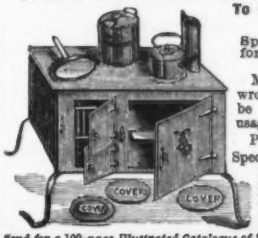
Account Book Manufacturers,

AND

General Stationers.

THE WROUGHT IRON

CAMP OR TRAVELLING STOVE



To burn wood or any fuel.

Specially designed for Explorers, Missionaries, etc.

Made of malleable wrought iron. Cannot be injured by rough usage. Weight 36 lbs.

Price complete, £3.

Specialities in Oil Cooking Stoves for Home and Export. Any kind of stove made to order.

Send for a 100-page Illustrated Catalogue of Stoves for all purposes, which will be sent free by mail on application.

WILLIAM POORE & CO.,
52, Queen Victoria Street, London, E.C.

AERTEX CELLULAR

This Label on All Garments.

THE CELLULAR CLOTHING CO. LTD. AERTEX LONDON

The Use of Red Garment in the Tropics.

IT has been definitely proved by the medical profession that the sun's rays in the Tropics act very forcibly, but that it is the blue rays (known scientifically as the actinic) which produce sunstroke, and that the red rays (known as the non-actinic rays) do not have any harmful effect. Heat alone is not injurious, as is evidenced by the fact that persons can stand high temperatures in Turkish baths, and stokers stay for days in boiler-rooms, without injurious effect, but heat together with strong sunshine often result in disaster. We have therefore produced a specially-dyed red AERTEX fabric which is not a bluish-red, but is so carefully selected as to colour, that only the red and orange rays are allowed to act on the body. The great comfort derived from the wearing of AERTEX Garments in hot countries will, we believe, be still further increased by the substitution of AERTEX Garments made from red yarns which have been chemically tested and proved to be able to withstand the actinic rays. We are therefore confident these garments will meet a great need, as they are admirably adapted for tropical use.

Suggestions from Medical men for fabric or garments specially suited for local requirements are respectfully invited.

NON-ACTINIC AERTEX CELLULAR.

Neck Sizes 14 to 17.

Day Shirt (soft throughout) **6/6**
Tennis Shirt, with Collar and Pocket .. **7/-**
Tunic Shirt, Soft Front, Laundered Linen Cuffs and Neckband **7/**
Day Shirt, with Small Linen Front and Round Linen Cuffs **8/**

WHOLESALE ONLY—

THE CELLULAR CLOTHING CO., Ltd.,
72 and 73, FORE STREET.
LONDON, E.C.

Cable Address: "CELLULAR." LONDON. A.B.C. Code used. Telephone: 838, London Wall.

AERTEX Cellular is entirely of British Manufacture.

LONDON RETAIL AGENTS—

City: ROBERT SCOTT, Ltd., 8, Poultry, Cheapside, E.C.
West End: OLIVER BROTHERS, Ltd., 417, Oxford St., W.

Full Price List of Aertex Cellular Goods for Men, Women and Children sent post free on application.

Any Garments mentioned in price list may be obtained from the above-named Agents, who keep a complete stock of AERTEX Cellular Garments and Fabrics.

All materials may be obtained at the above addresses by the yard, any length cut. Very light fabrics specially manufactured for the tropics.

Special study is given to Outfits for India and the Colonies. Estimates for complete outfits furnished at short notice.

Dr. J. Collis Browne's Chlorodyne

THE RELIABLE MEDICINE.

The BEST REMEDY known for

COUGHS, COLDS,

ASTHMA and BRONCHITIS.

Effectually cuts short all attacks of SPASMS, HYSTERIA and PALPITATION.

The only Palliative in NEURALGIA, TOOTHACHE, RHEUMATISM, GOUT.

Acts like a charm in

DIARRHŒA, CHOLERA, and DYSENTERY.

Convincing Medical Testimony with each bottle.

***Always ask for and see that you get the ORIGINAL and ONLY GENUINE*— Collis Browne's**

Of all Chemists, 1/1½, 2/9, 4/6.

INDEX TO ADVERTISEMENTS.

Where no number is given, the Advertisement does not appear this Month.

PAGE

Bookbinders, Booksellers, &c.
Sotheran & Co. .....*Cover* 2

Boots and Shoes.
Dowie & Marshall 13

Camp Equipment.
Edgington & Co., J. .....*Cover* 2
Wilkinson Sword Co..... 14

Cartographers.
Bacon & Co., Ltd. .....*Cover* 4
"Geographia" Ltd. 3
Philip, G., & Son, Ltd. .....
Stanford, E., Ltd. .....

Charities.
Dr. Barnardo's Homes .....
Great Northern Central Hospital 11

College.
Thames Nautical .....

Cutlery.
Hill & Son.....

Dentist.
Jones, Dr. G. H. .....

Foods for Travellers.
Allen & Hanburys Ltd..... 5
Bovril..... 5
Lea & Perrins' Sauce 8
Lemco..... 14
Oxo..... 14
Red, White & Blue Coffee 3

Furniture and Floor Polish.
Bonk, Limited.....*Cover* 3

Hotels and Restaurants.
Hôtel Metropole 3

Instruments for Travellers.
Cary, Porter, Ltd. 3
Clarkson & Co..... 5

Insurance.
Eagle Insurance Co. .....
London and Lancashire .....
Scottish Widows' Fund .....

PAGE

Lantern Slides.
Underwood & Underwood .....

Masonic Outfitters.
Toye & Co. .....

Medicines & Medicine Cases.
Browne, Dr. Collis 12
Burroughs Welcome & Co. .....
Dinneford & Co.....*Cover* 2

Naturalists.
Gerrard & Sons 7
Watkins & Doncaster..... 8

Outfitters.
Cellular Clothing Co. 12
Dowie & Marshall 13
Griffiths, McAlister & Co..... 5
Silver, S. W., & Co., and Benjamin Edgington .....*Cover* 4
Wilkinson Sword Co..... 14

Photo Engravers.
Bale, Sons, & Danielsson, Ltd.

Photographic.
Burroughs Welcome & Co. .....
Sands, Hunter & Co. 8
Sinclair & Co., Ltd. .....*Cover* 4

Publishers.
Bale, Sons & Danielsson....*Cover* 2
Cambridge University Press .....
Macmillan & Co. 11
National Geographic Magazine
Smith, Elder & Co. .....*Inset*
Stanford. E., Ltd. .....

Railways.
Great Eastern Railway .....

Rifles.
Wilkinson Sword Co..... 14

Soaps.
Wright's Coal Tar 4

PAGE

Sporting: Game, etc.
British Columbia..... 7
Cook & Son 9

Sporting Outfits.
Burberrys..... 7
Edgington & Co., J. .....*Cover* 2

Stamps.
Antarctic 5

Steamships—
Blue Funnel Line 6

Stores for Expeditions, &c.
Edgington & Co., J. .....*Cover* 2
Griffiths, MacAlister & Co. 5
Keating, T. 13
Silver, S. W., & Co., and Benjamin Edgington .....*Cover* 4

Stoves.
Poore, Wm., & Co..... 11

Tailors.
Bill, W. 9
Fisher's .....
Thomas & Sons .....

Taxidermists.
Gerrard & Sons 7

Tents.
Burberrys..... 7
Edgington & Co., J. .....*Cover* 2
Silver, S. W., & Co., and Benjamin Edgington .....*Cover* 4
Wilkinson Sword Co..... 14

Tours and Excursions.
Cook, T., & Son 9

Wines and Spirits.
Deutz & Geldermann 6
Heidsieck, Charles 6

Wireless Telegraphy.
British Telegraph Inst. Co., Ltd.

Woollen Merchant.
Bill, W. 9

BOOTS FOR EXPLORERS.

(REGISTERED AT STATIONERS' HALL.)

DOWIE & MARSHALL

(Established 1824)

Have for many years made a special study of the various kinds of boots required for different climates, and they have had the gratification of pleasing many Travellers, including members of the R.G.S., from the time of Dr. John Rae of Arctic renown to Sir H. M. Stanley, the African Explorer.

Country Customers should send, as guide to measurement, a pair of old boots and outlines of the feet.

Only the best hand-sewn Boots are made.

455, WEST STRAND, LONDON.

P.O. Telephone No. 9015 Central. (3 doors from Trafalgar Square.)

Telephone No. 5197 Gerrard.

MARTIN, HOOD & LARKIN,

Specialists in the

REPRODUCTION of MAPS and PLANS,

Lithographers and General Printers,

8, Gt. NEWPORT ST., LONDON, W.C.

ALL KINDS OF

Maps, Plans, and Charts.

WILKINSON'S,

PALL MALL, LONDON.

ESTABLISHED 1772.

COMPLETE CAMP EQUIPMENTS for NIGERIA, GOLD COAST, SIERRA LEONE, EAST AFRICA, INDIA, and all parts of the World.

CAMP BEDS.
VALISES.
COOKS' BOXES.
MOSQUITO CURTAINS.
UNIFORM BOXES.
LUNCHEON BASKETS.
TROPICAL CLOTHING.

Mining Engineers and Colonial Residents specially catered for.

All kinds of Goods Bought and Shipped to any part of the World.

Provisions packed to Order.

Foreign Parcel Post Orders receive Special Attention and Prompt Dispatch.

SPORTING GUNS and RIFLES for BIG GAME SHOOTING.

Colonial Rejector Guns, from **£15 15 0**

Non-Ejector, **£8 8 0**

Rifles of all bores always in stock.

THE WILKINSON SWORD CO., 53, PALL MALL, LONDON, S.W.

Telephone— 1365 GERRARD, 3918 REGENT. Code A.B.C. 5th EDITION. Telegrams and Cables— "SWORDCUT, LONDON."

BY ROYAL WARRANT TO H.M. KING GEORGE V. GOVERNMENT CONTRACTORS.

Concentrated Foods that can be relied on

Thousands of travellers, soldiers and explorers have testified time and again to the splendid value of LEMCO and OXO—in any climate—for maintaining physical health and energy during the rigorous hardships of an expedition.

These famous Beef-foods consisting of pure concentrated beef, manufactured under the severest scientific and hygienic conditions, are as valuable for giving increased nourishment and flavour to cereal, farinaceous and tinned foods as for use as strengthening beverages. Sustaining to the last degree, both LEMCO and OXO are also splendid restoratives in times of illness and emergency.

LEMCO and OXO

Made solely by Liebig's Extract of Meat Company, Ltd. (Established 1865.) Largest British cattle-farmers in the world. Government Contractors, Originators and Pioneers of Concentrated Beef-foods. Also makers of the following :—

Fray Bentos Ox Tongues. **Fray Bentos Ox Tail Soup.**
Fray Bentos Corned Beef. **Fray Bentos Pressed Beef.**

Thames House, London, E.C.

The
Geographical Journal.

No. 6. JUNE, 1914. Vol. XLIII.

ANTARCTICA AND SOME OF ITS PROBLEMS.*

By Prof. T. W. EDGEWORTH DAVID, C.M.G., F.R.S.

I. Physiography.

Area and Relief.—The area of Antarctica has been estimated by Dr. W. S. Bruce at over five million square miles.

Its mean altitude is perhaps the greatest of any of the continents. This has been roughly calculated at about 6000 feet, including in this altitude its icy covering. If this were removed, the mean altitude would be much reduced, by perhaps from 1000 to 2000 feet.

Coast-line.—With omission of minor indentations, and with inclusion of the seaward boundary of thick, fast ice on the coast-line, this measures no less than about 14,000 miles in length. Of this only about 4000 miles have been even approximately explored, and only about 2500 miles in very moderate detail. With the exception of the 2500 miles charted, mostly in rough detail, very little is known about the actual boundary between land and sea ice for no less a distance than about 11,500 miles. The difficulty of defining this unknown boundary by oceanographic survey alone, unsupported by inland sledging parties, arises from the fact that old pack ice, ancient fast bay ice, "schollen-eis" (formed of fleets of grounded bergs with the intervening spaces levelled up with drift snow), coastal ice of the nature of piedmont ice aground or afloat, together with large glacier tongues, fend off ships so far from the true rock coast, that the latter, unless it is formed of high bare rock, is invisible from a ship. Also over large areas of the coast-line there is a more or less gradual ascent from the coastal shelf ice to the inland ice without any bare rock whatever showing at the surface, to indicate where the ice leaves the sea and is

* Royal Geographical Society, January 15, 1914.

resting on land. Moreover, it is very easy to mistake, in the distance, grounded bergs for table-shaped mountains.

As an instance of the distance to which glaciers from inland spread seawards from the coast-line before they break off and form bergs, it may be mentioned that Wild, of Mawson's Australasian Antarctic Expedition, found that in Queen Mary Land the Watson glacier projects for considerably over 120 miles into the sea. The Ross barrier extends at a maximum about 400 miles seawards of the true rock coast at its apex.

Such portions of the Antarctic coast as are moderately well known may be divided (1) into more or less high rock coasts, of the nature partly of rückland, partly of rias coasts, with, in the case of East Graham Land, some foreland coast; (2) coasts with occasional nunataks rising above the general level of the inland ice, which may be termed nunatak coast; and (3) an ice coast. The last mentioned might be subdivided according to the nature of the ice, forming it into (*a*) land barrier ice, where the ice forms a sea cliff resting on a rock foundation; and (*b*) shelf ice, where the ice projects some distance from the shore seawards. The latter ice might be further subdivided, according to its mode of origin, into (i.) old bay ice, where it represents sea ice thickened by many years' growth; and (ii.) piedmont ice, either aground or afloat, formed through land ice advancing seawards for a greater or less distance beyond the true coast-line.

Of these three principal types of coast about 2500 miles are rock coast, about 1000 miles are known to be nunatak coast, but undoubtedly this type of coast will be found later to be far vaster in extent than the above-known distance.* The remainder of the coast, whose proportion to types (1) and (2) is as yet unknown, cannot exceed about 10,500 miles in total length. This third type of coast, whose boundary varies with the winds, ocean currents, tides, seasonal and secular variations in temperature, snowfall, etc., is the most characteristic feature of the Antarctic coast. It is, of course, a false coast in relation to the true outline of the land, and in the case of the Ross barrier, the Weddell barrier, and the Great ice-fields of New South Greenland is some hundreds of miles in advance of the true coast. It is quite worthy of some distinctive name such as the *Cryothis*,† or if the meaning of the term "shelf" can be extended to include old pack ice, old bay ice, "schollen-eis," piedmonts aground or afloat, glacier tongues, etc., it may be termed the ice shelf coast, or, as it is hardly a true coast at all, simply ice shelf. In the Ross sea region the rock coast, for the 1400 miles already known, is of Atlantic type.‡ It is a tectonic coast bounded by stupendous fractures all along the western shores of Ross sea, with several subordinate cross fractures.

---

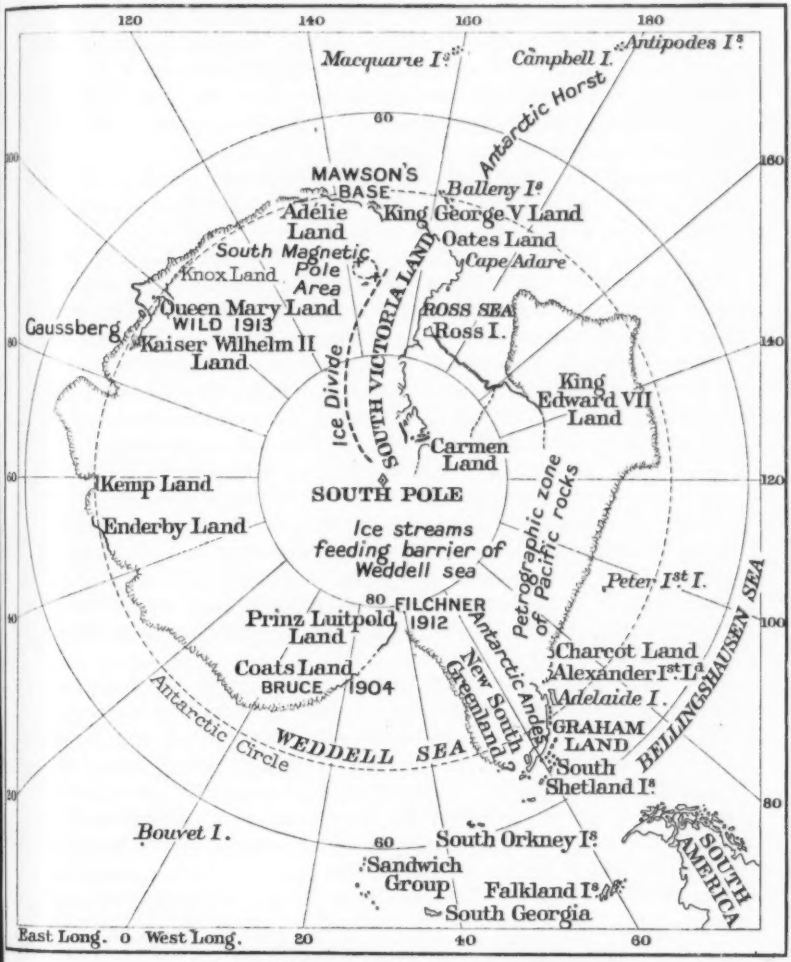
* Dr. Mawson's surveys, with those of Captain J. K. Davis of Mawson's ship *Aurora*, will have probably added 1300 miles to the known Antarctic coast.

† *κρυός*, ice, and *θίς*, a shore or beach.

‡ Prof. Gregory has proposed to class it as of Secondary Pacific type.

Within 10 miles back from the coast the land in places rises to elevations of no less than 8000 feet, but usually there is a coastal platform, formed of rock and sub-glacial *débris*, from 10 to 20 miles wide, and joining, at

SKETCH MAP SHOWING PROBABLE PETROGRAPHIC ZONE OF ANDES AND THE POSSIBLE FRACTURE VIRGATION OF THE ANDEAN ZONE TO JOIN THE ANTARCTIC HORST.



Scale 1: 60,000,000 or 1 Inch = 947 Stat. Miles

500 0 500 1000

FIG. 1.

that distance inland, the steep face of the block-faulted range of the Antarctic Horst.

In places, as at Cape Adare, Cape Washington, etc., this Atlantic coast is bounded by cliffs of marine erosion, several hundreds of feet high. In West Antarctica, in the area from Charcot Land through Graham Land to Terre Louis Philippe, the coast with its tuffaceous Jurassic strata at Hope bay, somewhat overfolded towards the east, its granodiorites and andesite-producing volcanoes, such as Deception Island, etc., its archipelago of the South Shetlands, and its foreland of marine Cretaceous, and partly marine, partly freshwater strata at Snow Hill, Seymour, and James Ross islands, with extensive sheets of basaltic lava and tuff, recalls the geological structure of Patagonia, and of the Chonos and Madre de Dios archipelagoes.

We hardly know sufficient yet of the rock coast from Hope bay to King Oscar II. Land and Foyn Land, and its relation to New South Greenland, to be able to classify it definitely.

In regard to New South Greenland, discovered by Johnson in 1822, and seen by Morrell in 1823, there is still some doubt whether it exists. But it must be remembered that Ross, that most accurate of navigators, reported an appearance of land in this direction further to the north, and that the soundings taken by Lieut. Filchner in the *Deutschland* show a distinct shallowing of the ocean floor in the direction of Morell Land; and R. C. Mossman has pointed out that the direction of the winds on the western side of Weddell sea is very suggestive of the existence of land in New South Greenland. Morrell, when he sighted the land to the south, at a considerable distance, was in lat. 68° 52′ S., long. 48° 11′ W. Filchner's sledge journey over the sea ice in this direction was, perhaps, not far enough to crucially test Morrell's statement, as at the end of the journey Filchner was still at least 60 or 70 miles to the east of where Morrell stated that he sighted land. The Shackleton and other Antarctic expeditions this year should do much to advance our knowledge of this much-debated area.

Mountain Ranges.—Dr. W. S. Bruce has already given an approximate forecast of the probable positions of the chief mountain ranges of Antarctica.* Dr. D. Mawson, in the *Geographical Journal* for May, 1911, adopts Bruce's view that the great block-faulted ranges of South Victoria Land, with their absence of folding and Atlantic type of eruptic rocks, are coincident with the high land recently described by Charcot at Terre Loubet, Terre Fallières, Terre Charcot; by Arçtowski in the neighbourhood of Bransfield strait, Gerlache channel, etc.; and by Nordenskjöld, Gunnar Andersson, etc., in the vicinity of Hope bay, Snow island, Seymour island, etc.

* 'Ueber die Fortsetzung des Antarktischen Festlandes zwischen Enderbyland, Coatsland und Grahamland sowie das Forhandensein, von neu Südgronland. Vortrag gehalten in der Sitzung der Schweizerischen Naturforschenden Gesellschaft zu Basel vom 7. September 1910.' Published by the Scottish Oceanographical Laboratory, Edinburgh.

The last area is one where there is a considerable development of Jurassic rocks, somewhat overfolded westwards, comprising variegated tuffs and richly fossiliferous plant horizons. The latter are associated with igneous rocks of a very marked Pacific type, and Arctowski, Nordenskjöld, Gunnar Andersson, Charcot, Gourdon, and others are quite in accord in regarding this western extremity of the Antarctic continent as a direct continuation of the South American Andes, and they consider its whole structure as distinctly of Pacific type. Arctowski names these ranges the Antarct-Andes.

Thus there are grave difficulties in the way of connecting up what may be termed the Antarctic Horst of Ross sea with the Andean fold ranges of Antarctica. Geographically, herein lies the greatest of unsolved Antarctic problems. The great question is, Are these two ranges one and the same, or does the Horst continue in the direction of Vahsel Bucht, at the head of Weddell sea, where the Horst may have become so low that it loses itself in a number of relatively small nunatakker? If the Horst follows the latter direction, Penck's view of a continuous strait from Weddell sea to Ross sea, cutting Antarctica in two, will prove to be correct.

In addition to this main range, Dr. Bruce shows on his map, published in 1910, subordinate spurs, one trending from the south-eastern end of the Ross barrier to King Edward VII. Land; a second diverging from the main range not far from the head of the Beardmore glacier, and trending to Enderby Land; while a third is shown as branching off from the Horst at a point about halfway between Mount Erebus and Charcot Land, and trending first towards the head of Weddell sea, then forking, the right fork going to Coats Land, and the left to New South Greenland.

The great journey of Amundsen to the South Pole in 1911 has confirmed Bruce's views in regard to mountains stretching from the direction of King Edward VII. Land to the Antarctic Horst. Lieut. Shiraze's party, on the Japanese Antarctic Expedition of 1911, travelled 150 miles south-east of the Bay of Whales, and he informed me that at their furthest point to the south-east they were at an altitude of 1000 feet above sea-level, and that they were confident from this that, although no rock was visible at the surface, land must have been present beneath, just as was the case at the large ice-covered island immediately south of Amundsen's winter quarters at Framheim.

Sufficient prominence has not been given as yet to this observation by the Japanese. It seems important as bridging over one of the gaps between King Edward Land and the distant appearance of land seen by Amundsen to the east of his South Polar track, near the parallel of 82° south. From the high ridge dividing the inland edge of the Ross barrier from the Heiberg glacier, Amundsen sighted a long low range of mountains stretching in an east-north-easterly direction, and apparently about 4000 feet in height. This newly discovered land area he has named Carmen

Land. Great geographical and geological interest attaches to these Carmen Land ranges. It will be very important to ascertain their structures particularly with reference to the question as to whether or not the Beacon Sandstone is developed in them. We know from Amundsen's photographs of Mount Fridtjof Nansen that that mountain, for some thousands of feet from its summit downwards, is almost certainly formed of Beacon Sandstone. As its altitude is 15,000 feet, and the sandstones appear to be approximately horizontal, if Carmen Land is also capped by this horizontal sandstone, and has the altitude of 4000 feet ascribed to it by Amundsen, then the throw of the great fault or zone of faults which bounds the Antarctic Horst on the north-east will probably be something of the order of 10,000 feet. It will also be very important to decide whether the north-west shore of Carmen Land is bounded by a diagonal fault, as seems highly probable, meeting the main fault line almost at right angles, this fault forming the south-east boundary of Ross sea. Obviously, Ross sea is an immense Senkungsfeld, and as far as can be judged from the photographs of Buckley island, taken by the Shackleton Expedition, the Beacon Sandstones dip down the Beardmore glacier valley, or, at all events, in a general east-north-easterly direction towards the Senkungsfeld. This dip of the strata towards the inthrown area may somewhat reduce the throw of the great fault, or zone of faults, to the east of the great Horst. At the south-west shore of Ross sea, under the Ross barrier, the throw of these faults is probably at a maximum, and cannot be less than about 8000 feet.

As far as the evidence goes at present, it would seem that the land between King Edward VII. Land and Carmen Land is separated for some distance by inlets or straits, but that there is a considerable area of relatively low land lying to the north-east of the point where the Devil's glacier junctions with the Ross barrier. It may be pointed out that there is still room for a narrow strait from Ross sea to Weddell sea, but not for a wide strait. If now we leave the highly interesting, as yet wholly unexplored mountains of Carmen Land, we might consider the direction in which these stupendous fractures are likely to trend. Amundsen shows on his map that the inner face of the Antarctic Horst, that is its escarpment facing the south-west, was trending, where he last saw it, nearly eastwards. This orientation, if continued, would carry the range to Vahsel Bucht at the Weddell sea. But if the Horst trends in this direction, how is the fact to be explained that, instead of attaining an altitude of 15,000 feet above sea-level, as it does at Mount Fridtjof Nansen, the land near Vahsel Bucht and Coats Land is only from 1000 to 3000 feet above sea-level? It may be argued that, even if the land on the east side of Weddell sea is not high, there may be a big step down from the shore to the bottom of a deep ocean, which step may mark a continuation of the fractures of the Antarctic Horst.

Is there any evidence that such a step exists? Bruce's soundings

show a depth of 2370 fathoms within less than 40 miles off Coats Land. If the land here be about 1000 feet high it drops 1000 feet + 14,220 feet = 15,220 feet in a distance of 40 miles. This is almost as great a difference as exists between the mountains of the Antarctic Horst and the bottom of Ross sea, and when one sees how the lines of deep soundings, as shown on Dr. Bruce's oceanographical map, of the Scottish National Antarctic Expedition, are crowded in close to the coast of Coats Land, one is certainly tempted to predict that the fractures of the Horst, that is those on its east side on the west shore of Ross sea, will join up with the steep submarine slope of Coats Land. How vastly interesting it would be to ascertain whether the nunataks of Prinz Regent Luitpold Land are formed of Beacon Sandstone, like South Victoria Land, or not! In regard to the other ranges, the existence of which is predicted on Dr. Bruce's map, I would venture to suggest that, in view of the apparent bight in the coast between Kaiser Wilhelm II. Land and Enderby Land, there are likely to be two low ridges, as shown on Fig. 1, on either side of this gulf. Of the two, probably the Enderby ridge is the more prominent.

Inland Ice.—Such a full and able account of the cirque and outlet glacier valleys of Antarctica has recently been given to this Society by Mr. T. Griffith Taylor that one may pass on at once to consider the inland ice of the Antarctic, and what may be termed the inland ice-streams, as distinct from ordinary outlet or cirque or Alpine glaciers. These ice-streams have not yet been described, but will be by Dr. Mawson, who seems to be the only Antarctic explorer, besides his second in command, Mr. Frank Wild, who has experienced them. They do not occur on the line of the Antarctic Horst in the Ross sea region, nor on the South American side of Antarctica, as far as I am aware. They differ from ordinary glaciers in that they are not bounded by rock walls, but are simply slight depressions in the general surface of the inland ice, marking areas where the ice is in more rapid movement than in adjacent areas. Such an ice-stream occurs just to the east of Dr. Mawson's winter quarters at Commonwealth bay, in King George V. Land. Another ice-stream of this type was discovered by Wild in Queen Mary Land. The latter ice-stream, which projects for over 120 miles into the sea, and called by him the Watson glacier, is more heavily crevassed, where it descends to the sea, than any other glacier or ice-stream yet observed in the Antarctic. A question of vital importance to the Austrian and Shackleton's Imperial Transantarctic Expedition is, What are the positions of the chief inland ice-streams which drain into Weddell sea? This is a question, perhaps, almost as important for them as the trend of the main mountain ranges. It is extremely improbable that any such ice-streams will prove to be as badly crevassed as the Watson glacier, inasmuch as the fall will, no doubt, be much less. It may even be possible to escape the ice-streams almost entirely by skirting along their margins. At present no one knows what these ice-streams will be like, when traced to a distance back from the steep coastal

slope. It would be futile to attempt to predict exactly where they are likely to be met with. But obviously there must be some feeders to the Kaiser Wilhelm II. Ice Barrier on the Weddell sea. If the Antarctic Horst extends to Coats Land, there will probably be very little ice movement between Coats Land and the South Pole; but if the Horst, as Bruce and Mawson suppose, is continuous with the Antarctandes, then there must be a movement of the inland ice from a continuation of the ice-divide (between the South Pole and the Queen Maud range) and the Weddell sea.

In regard to this "ice divide" (Eisscheide), it is important to note that this is well marked, from the point where we first crossed it, on the journey to the South Magnetic Pole area, on the Shackleton Expedition

FIG. 2.

in 1909, to the point where Shackleton reached it the same year, at his furthest point south, and Amundsen located it in 1911. Amundsen crossed the ice divide, 11,000 feet above sea-level, beyond the source of the Devil's glacier, and from there found the inland ice sloped down at a gradual angle to the South Pole, the elevation of the latter being estimated at about 10,700 feet. The further tracing of this ice divide and subordinate divides, so as to define the chief ice drainage basins, is obviously a matter of great importance. Obviously, when water becomes a solid, and is superimposed as a thick sheet upon a preglacial water-eroded landscape, it develops drainage systems of its own which may or may not necessarily coincide with that of the old landscape. In other words, the ice drainage is not by any means an antecedent drainage.

My attention has been called by Dr. A. Strahan, F.R.S., and G. W

Lamplugh, F.R.S., to a striking instance of this in the case of the old ice drainage system of Scandinavia during the Pleistocene Ice Age.

In the above case, the summit of Åreskutan, about 5000 feet high, was heavily glaciated by ice coming from an old ice divide, established during the maximum glaciation over the Baltic sea. Thus an ice divide was built up there over the deepest part of the drainage system of the pre-existing landscape.

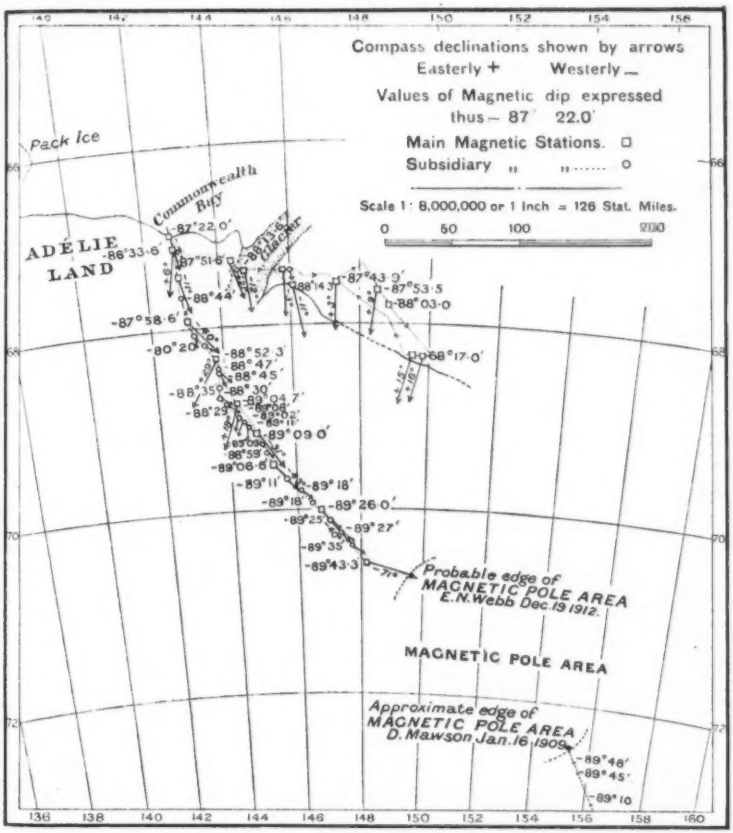

Compass declinations shown by arrows
Easterly + Westerly –
Values of Magnetic dip expressed thus – 87° 22.0'
Main Magnetic Stations. □
Subsidiary " " ..... ○
Scale 1: 8,000,000 or 1 Inch = 126 Stat. Miles.
0 50 100 200
Pack Ice
Commonwealth Bay
ADÉLIE LAND
Probable edge of MAGNETIC POLE AREA E.N.Webb Dec.19 1912.
MAGNETIC POLE AREA
Approximate edge of MAGNETIC POLE AREA D. Mawson Jan.16 1909.

FIG. 3.

This in turn suggests the question of the probable general thickness of the inland ice-sheet.

If the cross-section from the Antarctic Horst, at the Queen Maud range, to Enderby Land be at all like that in Fig. 2, it is obvious that the inland ice may be of vast thickness, possibly of the order of 5000 feet. It seems more probable that the Antarctic section, from the Horst

to the South Atlantic ocean, is more like that across Patagonia (Fig. 2), but the Antarctic land under the inland ice is probably higher than that of the Chile-Argentine divide. Probably the inland ice is thickest where it is dammed back against the western side of the Horst. This thickness can only be partially estimated from that of the ice in the outlet glacier valleys, for it does not at all follow that they necessarily drain the deepest part of the ice reservoir at the back of the Horst. The greatest thickness as yet measured, that of the Drygalski ice barrier tongue, is about 2000 feet. It has been suggested that the very strong local variations in magnetic declination, proved by Eric N. Webb of Dr. Mawson's

SECTION ACROSS THE NANSEN BARRIER.

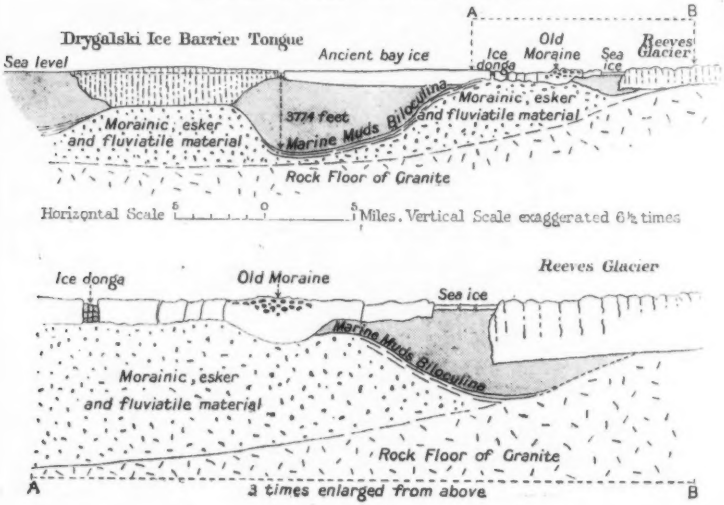


FIG. 4.

Australasian Antarctic Expedition, show that the ice-sheet on the magnetic pole plateau is of no very great thickness, as had the ice-sheet been many thousands of feet in thickness the tendency would have been to smooth out these curves. The nature of these variations is shown on Fig. 3, copied from *Nature* 1913.

If this problem is soluble, it must obviously be solved chiefly by the physicists. Probably wherever there is a continuous downward slope seawards of the rock surface, on which the ice rests, the thickness of the inland ice does not exceed about 2000 feet, but where tectonic sags and Senkungsfelden exist, so as to impound the ice, its thickness may be much greater.

Barrier Ice.—Brief reference may be made to the Nansen barrier, the Ross barrier, and the Kaiser Wilhelm II. barrier in Weddell sea.

The clue to the origin of the Ross barrier is undoubtedly afforded by the structure of the Nansen barrier. This structure is illustrated in Fig. 4.

This barrier ice-sheet is formed chiefly of glacier ice. The most important contributor to this barrier is the Drygalski ice barrier tongue, fed by a huge outlet glacier. The Larsen, Reeves, Priestley, Corner, and Campbell glaciers also contribute large volumes of ice; the Reeves glacier, in particular, another large outlet glacier, is a very important tributary. As shown on Fig. 4, the barrier is built up partly of glacier ice, partly, but to a very limited extent, of old bay ice. This glacier ice is of very uneven thickness. In the case of the Drygalski ice barrier tongue the ice is perhaps over 1900 feet thick, whereas to the north of Relief inlet it is only about 200 to 300 feet thick. It is doubtful to what extent this part of the Nansen barrier is made up of glacier ice, and to what extent old bay ice enters into its composition. At various portions of the ice cliff, between Relief inlet and Evans coves, its thickness appears to vary, as judged from the height of the cliff and the soundings, from about 200 feet up to about 600 feet. From high points, climbed by the Shackleton Expedition to the north of the Nansen barrier, one could see long moraines extending almost, if not quite in some cases, to the edge of the sea cliff of this barrier. At the same time, a section of the sea cliff showed that some of this moraine had become englacial. The survival of the moraines so far down towards the sea cliff of this barrier proves that the thickness of the barrier has not been materially increased by the snow which falls on its surface. For the most part, therefore, the Nansen barrier is undoubtedly made up of literally "thick-ribbed" ice, the connective tissue between the glacier ribs being chiefly formed of the coalesced fanned-out edges of the glaciers themselves. At the same time, the whole of this barrier is not composed of glacier ice, for, as shown in the section, there are belts of sea ice in places, as we were able to prove on the Shackleton Expedition by travelling over this sea ice, near the landward edge of the barrier, and testing the sea water in the large open leads. In places this sea ice was so thin that we had considerable difficulty in finding portions of it strong enough to bear the weight of our sledge. Time did not permit of our mapping the Reeves-Drygalski part of this barrier in more than rough detail, but as far as we could observe, the sea ice played only a very subordinate part in the building of this barrier. In places the pressure of the ice from the very active Reeves glacier appeared to have forced some of the other glacier ice away from the shore-line, and so open pools and wide lanes of sea water had become developed. In other places, on a much smaller scale, sea ice was developed within this barrier along great vertical shear planes. One of the largest of these is Relief inlet, which further towards the land we called the barranca, on account of its resemblance to the barrancas of Mexico. Its width varied from about 20 yards up to about 400 yards near its seaward termination, and it is

from 30 to 50 feet deep down to sea-level. It is, without doubt, a great shear plane formed through the Drygalski ice barrier tongue advancing more rapidly than the adjacent glacier fan from the Larsen glacier. Several of these barrancas were met with by us on the part of the barrier between Relief inlet and the point where the Reeves glacier reaches the coast. No doubt during the few weeks of summer thaw the barrancas are somewhat enlarged by thaw water, and undoubted thaw water channels are cut in places in the surface of this barrier. These latter, however, are quite distinct from the true barrancas, and have an ice floor under them, whereas the walls of the true barrancas are fault (glint or horizontal slide planes) planes which traverse the ice from top to bottom so as to admit sea water into the heart of the barrier.

A similar shear plane to Relief inlet is figured by Amundsen, in 'The South Pole,' in the map of his winter quarters, to the west of the hut. The latter disjunctive line in the Ross barrier is evidently due to the stemming action of the large ice-covered island to the south of "Framheim," checking the movement of the ice immediately in its lee—that is, to the north of it—whereas the unchecked ice to the west moves seawards more rapidly.

Another important feature in the Nansen barrier is that, whereas, where the thrust is a movement in extension it produces barrancas—that is, tensional glide faults or glints—in the ice masses adjacent to the lines of maximum movement, on the other hand, when the movement produces compression, asymmetrical folds and sharp overthrusts are developed in the glacier ice, and the muds and fluvio-glacial material on the sea floor become forced up to form pseudo-raised beaches, analogous to those of the Sefström glacier of Spitsbergen, described by De Geer and G. W. Lamplugh. These upthrust marine muds at the Nansen barrier rest on a foundation of ice about 20 feet above sea-level, but they have evidently been upthrust from a considerable depth, as is proved by the nature of the organisms contained in them.

In the case of the marine organisms in the raised marine muds, probably upthrust by an ancestor of the Ross barrier near Cape Barne, on the east side of McMurdo sound, Messrs. F. Chapman and C. Hedley consider that the organisms lived originally at a depth of about 100 fathoms. As they are now 160 feet above sea-level there is evidence there of a probable upthrust of about 760 feet.

Another point to be noted about the Nansen barrier is, that connected with it and underlying it are probably considerable banks of fluvio-glacial material. For example, at the end and off the end of the Drygalski barrier tongue, Captain Scott obtained soundings of only a little over 300 fathoms, whereas 20 miles nearer the shore, on the north side of the tongue at Relief inlet, Shackleton's soundings on the *Nimrod* showed a depth of as much as 660 fathoms. One may conclude provisionally that in advance of, and partly under the main glacier ribs of the Nansen barrier,

there is much fluvio-glacial material, carried superficially or englacially or pushed out under the ice.

It seems difficult, on any other hypothesis, to account for the sudden shoaling of the sea from 660 fathoms to about 330 fathoms.

Another point to be noted about the Drygalski ice barrier tongue is that we observed, on the Shackleton Expedition, that for about 2 miles inwards from its north and south margins, at a place where it is about 18 miles wide, that the snow lids of the crevasses were encrusted with a type of ice which we called moss ice or "spiracle" ice. It is formed of acicular needles of ice, growing vertically with small air spaces between them. They were developed over the thinnest parts of the snow lids. It appeared to me that they were probably formed from the vapour of the open sea water at the bottom of the crevasse, and that this relatively warm vapour was continually streaming upwards through the snow lid, and became frozen on its outer surface just as exhaled breath is frozen on the outside of a respirator on a frosty day. It seemed that possibly this spiracle ice might be relied on as a delicate test to decide whether or not barrier ice is aground or afloat. The central part of the Drygalski barrier is probably aground, though not continuously for its whole length, for the pool of open water reported by R. E. Priestley, of Lieut. Campbell's party on the last Scott Expedition, shows that the great clockwise eddy of Ross sea must work under the Drygalski tongue of the Nansen barrier, and the relatively warmer, more saline, water being deflected upwards to the surface on the north side of the tongue, the formation there of sea ice is prevented.

The existence of the great mass of sea water, above the freezing-point of fresh water, beneath the surface layer which is close to the freezing-point of salt water, is obviously a matter of extreme importance in connection with the problem of the rate of waste of barriers, and the problem of balance between their waste and supply.

E. W. Nelson recorded * temperatures below 0° C. down to nearly 200 metres, where the temperature rose to +0·24°. At 500 metres the temperature was +1·18°; at 1500 metres +0·935°. These observations were taken on December 14, 1910, near 66° 23′ S., 177° 59′ W.

In a preliminary report of the oceanographic results of the Filchner Expedition,† Brennecke records that in the Weddell sea on January 13, 1912, in lat. 70° 2′ S., long. 27° 26′ W., the change in temperature, from below freezing-point of fresh water to above, took place at about 180 metres. At 300 metres the temperature was +0·79° C., and at 1000 metres it was +0·32° C. Of course this relatively warmer water is able, by virtue of its greater salinity, to remain beneath the colder but fresher surface water.

* 'Scott's Last Expedition,' vol. 1, pp. 49–41. Smith, Elder & Co., London. 1913.

† "Ozeanographische Arbeiten der Deutschen Antarktischen Expedition (Die Eisfahrt)." V. Bericht von Dr. W. Brennecke, *Annalen der Hydrographie usw.*, 1913, p. 143.

In other words, the salinity factor is more important in determining the density of the water than the temperature factor. Obviously, therefore, as the bottoms of the Antarctic ice barriers mostly range from about 200 metres to 600 metres, or at a maximum 700 metres, below the surface of

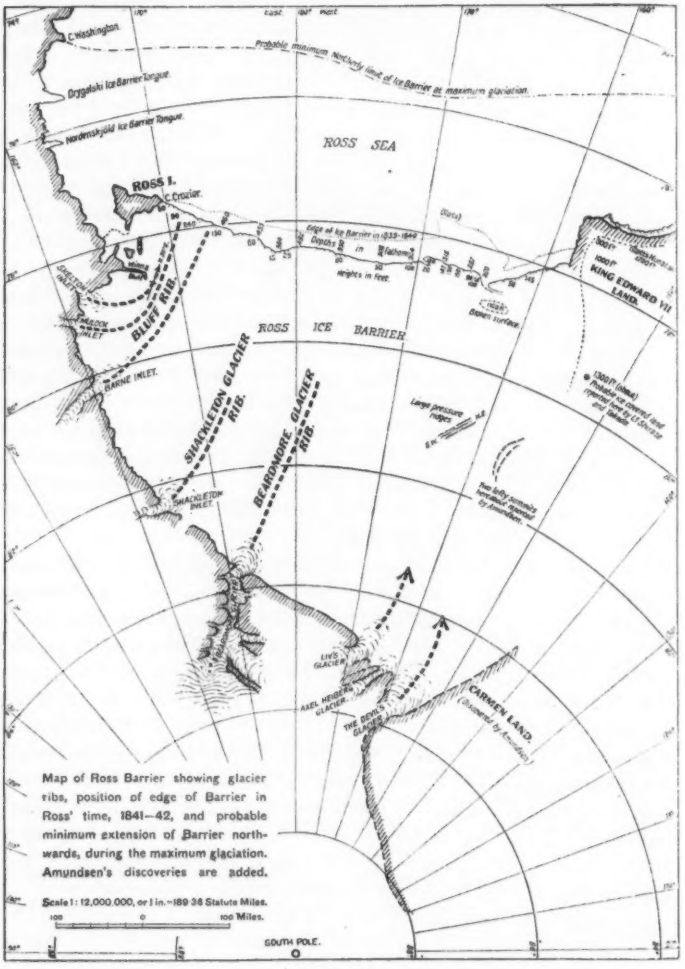

C. Washington
Probable minimum Northerly limit of Ice Barrier at maximum glaciation.
Drygalski Ice Barrier Tongue.
Nordenskjold Ice Barrier Tongue.
ROSS SEA
ROSS I.
C. Crozier.
Edge of Ice Barrier in 1839-1844
Depths in Fathoms
Heights in feet.
KING EDWARD VII LAND.
BLUFF RIB.
ROSS ICE BARRIER
SHACKLETON GLACIER RIB.
BEARDMORE GLACIER RIB.
Large pressure ridges
SHACKLETON INLET.
LIV'S GLACIER.
AXEL HEIBERG GLACIER.
THE DEVIL'S GLACIER.
CARMEN LAND.
Map of Ross Barrier showing glacier ribs, position of edge of Barrier in Ross' time, 1841—42, and probable minimum extension of Barrier northwards, during the maximum glaciation. Amundsen's discoveries are added.
Scale 1: 12,000,000, or 1 in.=189·36 Statute Miles.
100 0 100 Miles.
SOUTH POLE.

FIG. 5.

the sea, they must be continually in process of being melted off from below.

There follows a brief consideration of some vital questions affecting the great Ross barrier, formerly engrafted during the maximum of the

ice flood with the Nansen barrier, but since dismembered through deglaciation.

The plan (Fig. 5) shows the present shape of the Ross barrier, with the contributing glacier ribs. Just as in the case of the glaciers which contribute to the Nansen Piedmont, these ribs fan out after raising huge pressure ridges where they reach the barrier, until either their fanned-out edges touch one another, or the interspaces are filled with old bay ice and drifted snow. How far seawards the moraines from glaciers like the Beardmore, Heiberg, Devil's glacier, etc., can be traced before they become englacial is not yet known, and it is an important point to determine. In the Nansen barrier the moraines extend for about 20 miles from the shore before they begin to be englacial. The englaciation of the moraines is accomplished partly by insolation, which countersinks the blocks into the ice, but chiefly by additions of surface snow drifts which subsequently granulate and form ice.

On the seaward cliff of the Ross barrier, some 400 miles in length, and varying in height from about 20 feet up to over 150 feet, there is no visible trace whatever of morainic material, and with the exception of the ice near King Edward VII. Land, which is obviously land ice, its surface ice has evidently been formed from the granulation of drift snow, swept by the blizzard winds from off the high inland plateau, or in part snow which has fallen on the surface of the barrier itself. As the apex of the barrier is about 400 miles south of the terminal east to west cliff face of the barrier, and its observed rate of movement, near Minna bluff, as first proved by Scott, is about between 600 and 500 yards a year, it is obvious that, if this rate of movement is applied to the whole barrier, it would take ice at the apex $400 \times 3 = 1200$ years to travel to the sea cliff. The accumulated drifts and snowfalls of 1200 years would be very considerable, probably, as Mackintosh's experiments near Minna bluff showed, of the order in some cases, of as much as a foot of hard compressed snow, equal to about 7 inches of rain, a year. The movement off Minna bluff is probably much in excess of the mean, and the drift also in excess, owing to the effect of the great mole of volcanic rock which runs from Minna bluff to Mount Discovery. This congests the ice, and congests the drifts locally. Probably it takes much more than 1200 years for ice at the apex of the Ross barrier to reach the seaward ice cliff. This slower rate of movement would admit of a longer accumulation of snow, which, although annually less in amount than that concentrated on the barrier surface near Minna bluff, might yet attain a thickness of many hundreds of feet before the barrier face is attained. While it is generally conceded that the cliff itself of the Ross barrier, except near Framheim and King Edward VII. Land, is not made up of glacier ice, at all events in the portions above sea-level, it has been doubted whether, on account of the continuous thawing action beneath the barrier, any glacier ice, originally launched at the barrier apex, ever, *at the present*

time, reaches the sea front, after undergoing at least 1200 years of melting in the warm water at > 180 metres. In this connection the great variation in the height of the Ross barrier cliff should be especially considered. The figure below shows my present idea of the structure of the Ross barrier.

It is suggested that the differential height of the cliff may be due to one of three causes :—

1. Undulations in the surface of the barrier, running sub-parallel to the barrier cliff. These undulations may be termed tangential undulations. Thus, where the cliff intersects a crest, the cliff would be high, where a trough, it would be low.

2. Radial undulations due to glacier ribs, united by their fanned-out edges and perhaps a certain amount of old bay ice, and having certainly a considerable overburden of snow.

3. Differential etching by the Ross sea currents passing under the barrier.

Probably all three factors operate in producing this differential thickness, but it seems to me that No. 2 is the more important factor. Reference to Fig. 5 shows that the Ross barrier cliff is highest, and the ice therefore thickest, in a line with the main direction of movement of the glacier ice from Minna bluff seawards. That direction of movement has been shown to be about N. 30° E. The ice there is extra thick owing to the stemming action of the Minna bluff mole. As regards the effect of differential thaw, one would expect, as the water of Ross sea moves in a great clockwise eddy, that the chief etching effect would be on the eastern (the warmer) side of the eddy. As a matter of fact, Amundsen records that, in spite of the much more intense cold at his winter quarters, Framheim, as compared with that at Captain Scott's at Cape Evans, there was always open water all through the winter at 8 miles to the north of Framheim.

It would be a matter of great importance to get accurate serial temperatures at many points along the face of the Ross barrier, the Kaiser Wilhelm II. barrier, and any other Antarctic barriers, and to ascertain whether the lowest parts of the ice cliff coincide or not with the currents of warmest water.

It would also be important to ascertain, by control specimens, etc., the rate at which barrier ice will melt in sea water of a given temperature. Also as many series of close soundings as possible should be taken at right angles to the paths of movements of barriers, so as to try and locate the old piedmontine moraines dumped on to the sea floor.

During the ice flood the Ross barrier ice rested hard on the bottom of Ross sea, and moved fully 200 miles further north than the present position of its ice cliff. At such a time there could have been little, if any, submarine thawing of the bottom of the great ice sheet. It must then, during maximum glaciation, have carried vast quantities of englacial

SECTION ACROSS ROSS BARRIER, EAST TO WEST, SHOWING THE ICE RIBS OF THE FLOATING GLACIERS JOINED UP BY FANNED OUT GLACIER EDGES, OLD SEA ICE, AND OLD DRIFT, SNOW

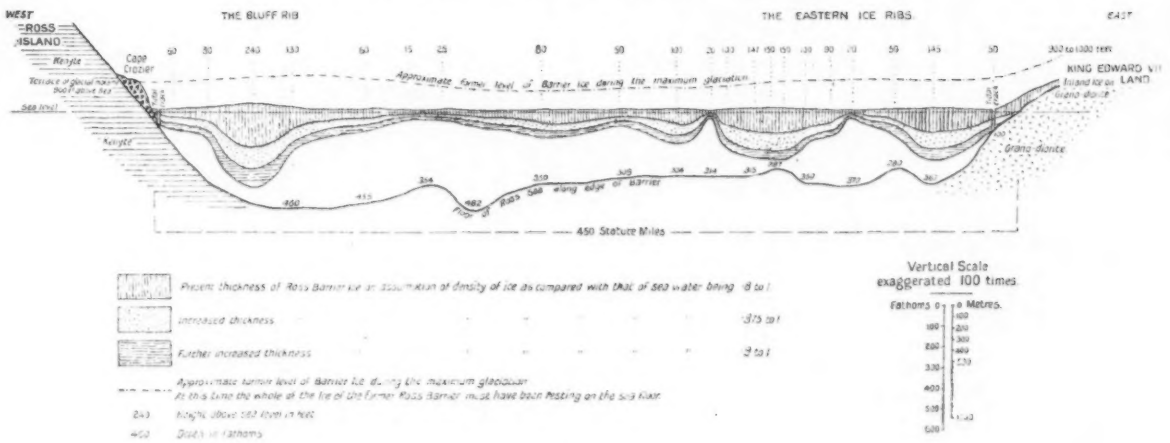

WEST
ROSS ISLAND
THE BLUFF RIB
THE EASTERN ICE RIBS
EAST
Cape Crozier
Approximate former level of Barrier Ice during the maximum glaciation
KING EDWARD VII LAND
Island Ice on Grand Barrier
Grand Barrier
Sea level
450 Statute Miles
Present thickness of Ross Barrier Ice on assumption of density of ice as compared with that of sea water being 8 to 1
Increased thickness 375 to 1
Further increased thickness 2 to 1
Approximate former level of Barrier Ice during the maximum glaciation
At this time the whole of the Ice of the Former Ross Barrier must have been resting on the sea floor.
Height above sea level in feet
Depth in fathoms
Vertical Scale exaggerated 100 times.
Fathoms
Metres.

Fig. 6.

moraine to its sea front, near the latitude of Mount Melbourne. Although much of it would have been floated off, encased in bergs, there should still be traces of the chief dumping grounds, which were probably mostly in line with the moraines.

An Antarctic feature, which is interesting in connection with the movement of the ice sheet in the North sea of Europe in Pleistocene time, is that formerly an ice sheet 3000 to 3500 feet thick, 400 miles wide, and 600 miles long, not only pushed across the sea floor, when as much as one-third of the ice was above water, but also intensely glaciated Ross island opposed to its path, loaded it in places with moraines, and pushed marine muds up from depths of at least 100 fathoms to heights of 160 feet above the present sea-level.

Had such an ice sheet been developed in the North sea in Pleistocene time, with a great thrust imparted to it by the Scandinavian glaciers, the Shäker Rack would not have stopped it, nor even necessarily the shallower state of the North sea as compared with Ross sea, but it would probably have reached the Yorkshire coast and dammed back the rivers, producing those lakes with westerly overflows, so ably traced and described by Prof. Kendall. Truly the arm of an Antarctic glacier is long.

Deglaciation.—The recent retreat of the Ross barrier (vertically at Ross island its surface has shrunk by at least 800 feet, and horizontally it has retired southwards 200 miles since its maximum development, in places from 20 to 30 miles even since Ross's determination of its boundary, about 1840–1842) introduces the subject of Antarctic deglaciation. Soundings in the Weddell sea by Filchner already show a former greater advance of the Kaiser Wilhelm II. barrier. Nunataks glaciated over their summits, like Borchgrevink nunatak in King Oscar II. Land, Gaussberg, the nunataks of Queen Mary Land and King George V. Land, the former glaciated condition of Bransfield strait, Gerlache channel, and Eastern Graham Land, as described by Arçtowski, Charcot, Nordenskjöld, and Gunnar Andersson, all point to waning glaciation near the Antarctic circle, just the area where, on account of its proximity to moisture-bearing currents, one would expect the glaciation to be at its maximum now. Much nearer the South Pole there is abundant evidence of waning glaciation. At Mount Hope, at the entrance to the Beardmore glacier, on the poleward side of 83° S., Shackleton found the summit, 2000 feet above the adjacent glacier, strewn with a great variety of true erratics of limestone, etc., resting on the granite of which Mount Hope is composed. Specimens of these erratics were brought back and subsequently determined. The Beardmore glacier was, therefore, formerly at least 2000 feet thicker than it is at present. Even at Buckley island, at the head of the Beardmore, there is clear evidence of the inland ice having formerly been much higher than it is at present. Probably about 1000 feet of ice (its reduction may have been a little, but not much less) has disappeared from the inland ice

cap since the culmination of the ice flood. The glaciers in the outlet valleys have sunk by 2000 to 3000 feet. The surface of the ice sheet near King George V. Land, Adelie Land, Queen Mary Land, Gaussberg, King Oscar Land, and West Antarctica generally, has sunk by about 800 feet. As the head of the Beardmore glacier is only 5° from the South Pole, it may be said that the deglaciation is general, from South Pole to Antarctic circle. Where a local general advance of a glacier has been noticed, as appears just now to be the case with the Mount Larsen glacier on the west side of Ross sea, it may be due to that periodic ice discharge to which, as G. W. Lamplugh informs me, De Geer has suggested that all glaciers are probably subject, and which perhaps explains such apparent

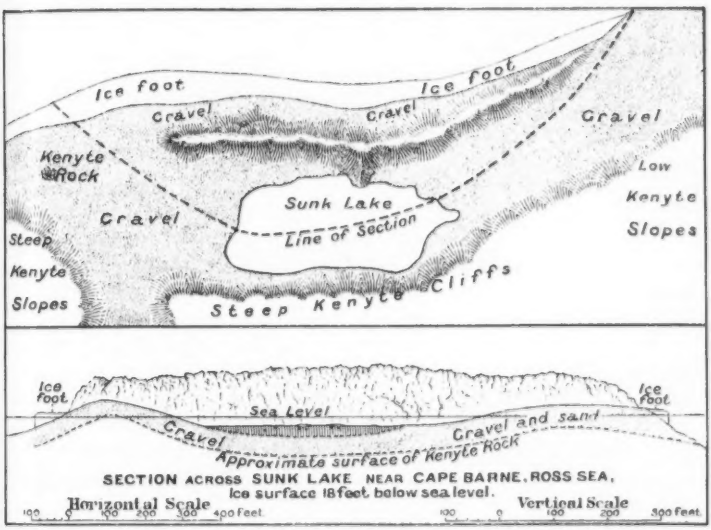


FIG. 7.

anomalies as that of the Sefström and Post glaciers of Spitsbergen, of which the former has recently advanced while the latter is in retreat, and yet both are not many miles distant from each other.

An interesting piece of evidence on the relation between waste and supply of ice is afforded by Sunk lake near Cape Barne.

This lake is within a few score yards of the seashore, from which it is isolated by gravel banks at either end. The surface of the ice of Sunk lake is now 18 feet below sea-level. It cannot be said obviously that this is due to the thaw water leaking out into the sea. The loss in level of this ice is chiefly due to evaporation. Evaporation at this spot perhaps exceeds precipitation. At the same time, the fact must be mentioned that Sunk lake is much exposed to the blizzard winds, so that

there is a tendency for it to be swept clear of snow. Numerous other lakes in the vicinity more favourably situated for retaining precipitation, but with their surfaces above sea-level, show a similar recent shrinkage.

Two rough diagrammatic sections are shown on Fig. 8, which should explain themselves, in showing the difference in structure between the Antarctandes and the Antarctic Horst.

II. Geology.

The great Antarctic Shield has a foundation of pre-Cambrian gneisses, pegmatites, granulites with garnets, actinolite, scapolite, kyanite, andalu-

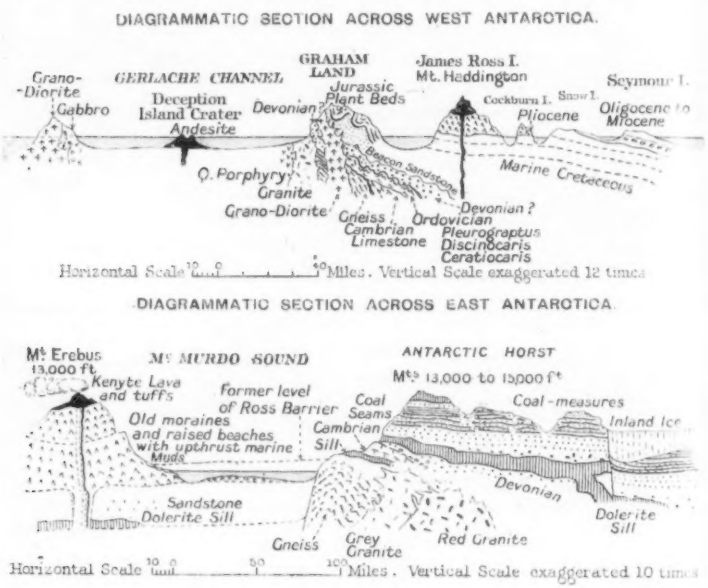


FIG. 8.

site, etc., schists. These are developed all around from Queen Mary Land to the Queen Maud ranges.

In the Antarctic Horst of the Ross region one finds this crystalline complex followed by limestones with *Archæocyathinæ* and a variety of calcareous plant allied to *Solenopora*. These are succeeded by sandstones, dark shales, calcareous in places, in which F. Debenham and Griffith Taylor have found fossil fish-scales which, as Mr. Taylor announced to this Society, Dr. A. S. Woodward considers to be certainly of Devonian age. Next in age is a great series of granites, occasionally containing

allanite, and sphene-bearing diorites. The diorites appear to be the oldest of this series, and are followed by grey granites, in turn intruded by red granites. Some of these granites are distinctly alkaline. Above these igneous rocks and older sedimentary rocks at the Antarctic Horst is the vast coal-bearing formation with the seven seams of coal discovered by Wild, when climbing the Beardmore glacier with Shackleton, in 1908. This coalfield extends all the way from the Queen Maud ranges to the Sandstone nunatak, lately discovered by Madigan on the Mawson Expedition in King George V. Land, a distance of fully 1400 miles. Fossil wood and rootlets were found by Shackleton in these measures; and recently, by the splendid heroism of Captain Scott and his comrades, fossil leaves, in a good state of preservation and of priceless scientific value, have been saved for science. Dr. Newell Arber's report on these will soon entirely settle the age of these important coal-measures. In the neighbourhood of the Priestley glacier, near Mount Nansen, R. E. Priestley discovered large pieces of wood in this formation, apparently coniferous. F. Debenham, in vol. 2 of 'Scott's Last Expedition,' states that he considers these coal-measures to be probably of late Palæozoic age. We are thus confronted with the extraordinary problem of trees, probably coniferous, flourishing within 5° of the South Pole itself in a zone which is now, in winter-time, more or less in complete darkness for five months in the year. Modern conifers are not known, as far as I am aware, to penetrate the Polar circles. Could this coal-flora have flourished, even under warmer conditions, with the Beardmore glacier area situated in its present relation to the South Pole, so that the flora would have been in darkness for five months of the year? If not, has the Pole shifted, or has Buckley island shifted in regard to its present distance from the Pole? This is a problem for the botanists and geophysicists.

A similar but less striking problem is afforded by the rich Jurassic flora of West Antarctica at Hope bay, and the fossil *Fagus* and *Sequoia* leaves in the Lower Miocene beds of Seymour island, both outside the Antarctic circle.

Next, intruded into this coalfield is an immense series of dolerite sills, like those of Tasmania, and of the Karoo systems of South Africa. This series is perhaps of Lower Cretaceous age.

There follow the strongly alkaline kenytes, trachytes, phonolites and other rocks of the Erebus group of volcanoes. Erebus is still erupting kenyte. In West Antarctica the petrographical province with its great development of grano-diorites and andesites is distinctly Andean. The Jurassic strata are asymmetrically folded eastwards, and all the region is typically Andean. On the east side, near Ross island, Snow hill, and Seymour islands, Nordenskjöld and Larsen have proved the existence of great fossiliferous formations, which the former has shown range from Cretaceous to Pliocene. In the Lower Miocene, or Oligocene, of Seymour island remains of extinct penguins have been described, which should

be compared with the fossil penguin remains from the Oamaru beds of New Zealand, which latter are older Tertiary. The basaltic tuffs and lavas of James Ross island come next in age. These are capped by the late Pliocene Pecten-Conglomerate. The whole of the section in this eastern portion of Graham Land closely resembles the Southern Argentine section to the east of the Andes.

The raised beaches of this region do not attain a high altitude above sea-level, while in the Ross sea region it is doubtful whether true raised beaches extend higher than about 50 feet above the sea.

III. Oceanography.

Space does not permit the discussion of the many interesting oceanographic problems awaiting solution. In addition to tracing out the great submarine ridges and banks, as many soundings and temperatures as possible are needed in the neighbourhood of great barriers and glacier tongues. Current observations are obviously much needed, deep as well as surface.

IV. Meteorology.

In meteorology there is a grand field for research. Dr. Bruce has pioneered the way in West Antarctica, and as the result of his South Orkneys observatory, and the later observations established by the enterprise of the Argentine Government, Dr. R. C. Mossman has lately shown that it is possible to predict the rainfall for sub-tropical Chili by knowing the barometric pressure in the South Orkneys. A high barometer there means that the Weddell sea is iced over. A severe season with much sea ice in the Antarctic appears, therefore, to be causally connected with a high barometric pressure, and this high pressure drives the low-pressure rainy belts further north than usual, and this gives sub-tropical Chile a good rainfall. Mossman has further shown that there is a remarkable coincidence between the height of the water of the Paraná river and that of the barometer in the South Orkneys. Mawson's wireless and meteorological station at Macquarie islands, which has daily been transmitting the weather elements to Australia and New Zealand, has proved of such value for understanding weather conditions that the Commonwealth Government have decided for the present to maintain the station at their own expense.

It is hoped that in time a causal connection will be traced between the condition of the ice near the Ross sea and the position of the rainy belts over Australia and New Zealand. With a more detailed knowledge of the oceanography, glaciology, and meteorology of Antarctica, the whole cycle of weather conditions, not only in the Southern Hemisphere, but even north of the Equator, will become much clearer. When one thinks of the financial losses, sufferings to man and beast, even disastrous shipwrecks that may be averted by reason of this fuller knowledge, one cannot

but feel that, apart from the gain of noble traditions and high sentiment, Antarctic exploration, with all its hazards and all its tragedies, is more than justified by its solid additions to the sum of human knowledge.

Major DARWIN, Vice-President (before the paper): I regret to say that the President, this being the night before the opening of Parliament, is detained elsewhere, and could not unfortunately be present. Prof. David, who has kindly consented to lecture here to-night, is going to discuss certain unsolved problems connected with the Antarctic continent. I have no doubt that in speaking, he will deal with these questions partly from the geological point of view, and still more so in his written paper; but I think we ought not to complain of that, for no one can understand the geography of any country thoroughly, or at all well, without knowing a great deal of its geology. Geology and geography must for ever in future go hand-in-hand. But whether we look on Prof. David as a geologist or as an explorer, he is eminently fitted to deal with the subjects which he intends to treat of. With regard to his scientific qualifications, after he had left Oxford University and had done some other geological work in England, he went out to the Geological Survey of New South Wales, and from there he was made Professor of Geology at the Sydney University, an ample proof that the work he had done in the field of geology was supremely good. I will only mention one other expedition of his, not the most important he has undertaken, namely that to the island of Funafuti, the object of which was, in part at all events, to test my father's theories of coral reefs. I believe the result of the expedition was to prove, or to indicate, that my father was more or less right. It is not surprising, therefore, that I should be ready to back up Prof. David in all his geological theories! But if we look at Prof. David as an explorer, he is equally worthy of esteem. We all know that he went with Sir Ernest Shackleton on his famous expedition, and on that expedition he was one of the party to ascend Mount Erebus, and I think he was the leader of the party that went so far in the direction of the Magnetic Pole. We have, therefore, in Prof. David an unique example of a man who combines first-rate scientific knowledge with the best possible training in Antarctic travel, and therefore I am sure that all of us, and especially the experts in Antarctic travel, will listen to him with the greatest interest and attention. I will now ask him to deliver his paper.

For Sir E. Shackleton's remarks after the paper, see *Geogr. Journ.*, March, 1914, p. 318.

Mr. FRANK DEBENHAM: It really seems rather invidious to try and add to what Prof. David has said about the problems that still remain to be attacked, but since Sir Ernest Shackleton has just told us more in detail than most of us knew before what are exactly his aims as far as the scientific staff is concerned, perhaps one or two more points may be touched upon. You will have noticed that he is arranging to have four geologists and only two biologists. To some that may seem a little bit queer, although he has said geologists are needed for the work rather than most of the other scientists. The reason for that is that there is a very pretty problem remaining which Prof. David did not have time to more than touch on. It will be seen from this map that from the point where Amundsen mounted the main plateau of Antarctica there are three mountain ranges running out. That is rather a strange thing in geology, and does not happen often. To add to that, to complicate the problem still further, we know that in Graham Land, that is on the South American side, the continent itself

is very much younger than the Victoria Land side. It is younger as regards length of time above sea-level. Coal exists in the most recent sedimentary rocks on Victoria Land, and those most recent rocks are Upper Palæozoic, which is very much older indeed than Jurassic and Cretaceous, which Prof. David has described as being found in Graham Land. Now, the route of the Trans-Antarctic party is practically direct to the Pole, and they must meet in some part of that journey—we hope not very steep mountains—but some mountains to continue the range Amundsen has pointed out as running over in the direction of Coat's Land and possibly turning one way or the other to other parts of the continent. So this Trans-Antarctic party must settle a very big problem, the relation between the young Antarctic and the older Antarctic on the Australian side. Sir Ernest Shackleton's other two parties will help to solve the same problem, because they will decide whether Graham Land is really part of the Antarctic Continent as we know it, perhaps more generally, that is to say the greater part of the continent which is on the Australian side of the Pole. There may be a strait separating Graham Land; that there is no channel right through to the Ross sea seems to be pretty well proved by Amundsen's discoveries. Shackleton's party to the east will, we hope, connect up still more the known parts of the continent—connect up Coats Land and Prince Luitpold Land further south still; they will find out what sort of plateau is to be met with on this side of the Pole, for we may think of the Antarctic continent practically as a plateau. We have got evidence for its age in a few places, but not generally; there is a great deal to be done still, and the Trans-Antarctic expedition is going to settle that geological and geographical problem in about the best possible way. For the continent must be attacked from this side in order to discover how it is made up. There is a young Antarctic and an old Antarctic, and we do not yet know where they meet.

Mr. C. S. Wright: I have listened with very great pleasure to Prof. David and his exposition of the problems that still await solution. There are, however, one or two points upon which he did not touch—presumably on account of lack of time. He mentioned the problem of the formation of the Barrier; that I will not go into except to point out that we started an argument upon this very point last April, and have not yet agreed, so it appears probable that here is a question which will only be settled by additional data.

One of the biggest problems, I think, that still awaits solution is the question of the origin of the blizzards—the very high winds which sweep down so suddenly and cause such trouble to travellers in those parts. It has been attempted to explain them as the result of the damming up of southerly winds with an easterly component due to the Earth's rotation, against the western mountains, until the pressure is sufficient to overcome the restraining forces. It is supposed that when the pressure is sufficiently great, the equilibrium breaks down and the wind rushes out suddenly in the form of a blizzard; but it seems doubtful if this can be called a satisfactory explanation of the phenomena. I would like to throw out the suggestion that true blizzards (such as those met at Cape Evans), may be found to be connected with the height of the isothermal layer. Over the equator the isothermal layer is met with at a very great height, and it appears to be lower towards the Poles. If, now, we accept the records of Dr. Simpson's balloon ascents at Cape Evans, we find that the temperature gradient in the atmosphere is approximately the same in the south as it is here. Since there the temperature at the Earth's surface is much lower, and since the isothermal layer appears everywhere to have a lower limiting temperature of about −80 C., it would appear that this layer may come within measurable distance of the summit of

Erebus and other high mountains. On this view the blizzard may be considered as caused by a sort of short-circuit of the upper circulation of the atmosphere. It seems certain at least that blizzards, as we know them, are more frequent in the vicinity of high land.

There are other points, but one only I will mention. Prof. David has given the explanation of the growth of the Barrier as due to glacier tongues pushing out over the sea, and being joined together by snowfall, thus uniting the isolated tongues into a coherent whole. Another possibility does occur, however. By measurement of the thickness of the sea-ice, we found that after a certain thickness the ice appeared to grow from below at a rate which was approximately constant and independent of the depth at the time. According to Prof. Barnes, this would argue a supercooling of the sea (probably by the high winds), and that the growth was from this supercooled water, and therefore almost independent of the local meteorological conditions. It seems probable to me, since the growth in McMurdo sound was of the order of 8 feet in four months, that under peculiar conditions the Barrier could grow in the same manner to a not inconsiderable extent, or even be originally formed from sea-water.

The next expedition should undoubtedly investigate this matter, by measuring the sea temperature with a delicate electrical micro-thermometer.

Nelson found when he measured the temperature of the sea under the winter ice, that it was constant within the limits of accuracy of his thermometers ($\frac{1}{300}$° C.). The temperature of the sea, in fact, did not appear to vary during the whole winter, until in the spring there occurred a complete change in the direction of the prevailing ocean currents.

Major DARWIN said he was in no sense an expert, but was sure that his remarks would be endorsed by everybody present. With regard to the several expeditions about to start for the Antarctic, he was certain that they all admired the courage of these gallant gentlemen in going out to face this intense danger—for the danger was intense. He was not the least surprised that there should be men willing to do so, because Englishmen were always to be found willing to face death. But when he read the accounts of the intense discomfort, the misery almost, which was suffered on these expeditions, he did wonder that men could be found ready to go through all that suffering merely for the sake of getting scientific results. They deserved their keenest thanks for what they were going to do and for what they had done. Their Society was in no sense responsible for either the equipment or the plans of any one of these expeditions, but they would all go out with their keenest and heartiest hopes for their success. As to Prof. David, he had chosen a particularly opportune moment for discussing these Antarctic problems; he had discussed them with the greatest ability, and what he has said to-night, would be studied by the members of all these expeditions with the greatest care. He had done really good work in the cause of Antarctic exploration by such a careful study of the problems which had yet to be faced, and by his very instructive discourse.

Prof. DAVID: I am deeply grateful to you for the kind way in which you have spoken about my lecture, and to you all for the very hearty way in which you have thanked me for this lecture. In answering the couple of questions put to me by Mr. Wright of the Scott expedition, in reference to the region of blizzards and in reference to the question whether the Great Barrier can be formed by continuous freezing of sea-water, I would say in regard to the first, I have tried to just touch lightly on the question in the paper which has been written for the *Geographical Journal*. In a lecture like this it is impossible for one to go into details of the scientific problems. I would ask those who are specially

interested in those details to consider the article when it is published. I would just point out that it cannot always be a high land, very high continuous land, because at Wild's base, where the land was not high, the blizzards were intensely strong, and no less strong were the blizzards at Mawson's base, where the land in the immediate vicinity is not mountainous at all. With regard to the question whether the sea-ice could form a barrier, I would point out that just like this small remnant of this barrier, the great barrier varies very much in thickness; it is only about 20 feet above sea-level in some places, and at other places it is 150 feet. If the structure were formed by the very steady freezing of sea-water, would you expect to find these variations in thickness? I have tried to touch on the question of taking temperatures. May I remind you that if any of you wish to continue this discussion, and make it as detailed and as scientific as you will, there will be an excellent opportunity for you to do so this year in Australia at the meeting there of the British Association for the Advancement of Science, when Mawson is going to open a special discussion on Antarctic exploration. I cannot close this acknowledgment of the vote of thanks without taking the opportunity of publicly wishing Godspeed and a safe return to all those who are going out on these Antarctic expeditions this year, and especially to my old leader and his comrades. I am very grateful to you for the way in which you have listened to this lecture.

THE GEOGRAPHICAL RESULTS OF THE NIGERIA-KAMERUN BOUNDARY DEMARCATION COMMISSION OF 1912–13.*

By Captain W. V. NUGENT, R.A.

THE section of the boundary between Nigeria and the Kameruns which was demarcated by an Anglo-German Commission during the winter of 1912–1913, is that which lies between the village of Bayare, 30 miles south-west of Yola, and the customs station of Obokum, on the Cross river. The total length of this frontier, measured from post to post, is 360 miles. It is partly natural, partly artificial, and lies for the most part in wild mountainous country, crossing the long spurs which run north and west from the central plateau of the Kameruns, into the fertile plains of Nigeria.

Recent explorations in the Kameruns have determined the configuration of the high plateaux and mountain ranges, which extend south-west in practically unbroken lines, from the Alantika and Shebshi groups, south of Yola, towards the Bight of Biafra, where they culminate in the Great Kamerun peak, the same chain rising again from the sea to form the island of Fernando Po. The frontier between Yola and the Cross river, running also south-west, follows, generally speaking, the western limits of these highlands, dividing, politically, the Kameruns from Nigeria, and geographically, mountains, torrential streams and sparsely inhabited areas from wide fertile plains, great navigable waterways, and densely

* Royal Geographical Society, March 9, 1914. Map, p. 730.

populated districts. The principal localities of geographical interest crossed by this boundary are the Shebshi mountains, the valleys of the Teraba, Donga and Katsena rivers, and the high watershed between the Benue river system and that of the Cross river.

It is worthy of note that the Benue itself, as well as its three great southern tributaries, all of which rise on the plateaux of the central Kameruns, only become navigable for canoes near the points at which they cross the boundary into Nigeria. These limits of navigation have naturally had an important effect on the distribution of man over the country—the more civilized peoples inhabiting the plains, where trade routes are numerous and easy; while the savage pagan tribes, who care nothing for trade and only want to be let alone, have withdrawn to the almost inaccessible hilltops. It has yet to be proved, however, that the inhospitable Kamerun mountains do not contain a far greater source of wealth, in the shape of undeveloped minerals, than the wide cultivated plains of Northern Nigeria.

The area through which the boundary-line runs was surveyed by the Commission under Colonel Whitlock, R.E., between 1907 and 1909. Having been a member of that Commission, I was sent out again in August, 1912, to mark the boundary on the ground, the line having been previously settled approximately on the map, at a conference between the British and German Governments. Lieutenant Kyngdon, R.A., was appointed to assist me, and two non-commissioned officers of the Royal Engineers were attached to the Commission; one being a topographer, and the other a stonemason, whose duty it was to make the cement pillars for the iron boundary poles.

Doctor Lobb, of the West African Medical Service, was appointed medical officer, and when we arrived in Nigeria, the party was joined by a political officer and an escort of 30 men of the West African Frontier Force, under Lieutenant Pawle of the Border Regiment. This escort remained with us all the time we were in Northern Nigeria, being afterwards relieved by Southern Nigeria troops when we entered that country.

The main purpose of the expedition was the demarcation of the frontier; but the party made use of this opportunity to carry out a good deal of additional survey work, more especially in the Kameruns, using as a basis the triangulation points previously fixed by the Survey Commission. It was also possible to study more closely the geographical features of the actual boundary zone.

The Commission arrived in the mouth of the Niger on August 31, 1912, and proceeded to Yola by river steamer. The journey of 800 miles up the Niger and Benue occupied three weeks. At Yola 300 carriers were collected, mostly Hausas and Fulanis; also guides, interpreters, and horse boys. Horses were procured from the Emir, and they were most useful during the first part of the work, when the country was more or less open and free from the "tsetse" fly.

The British party left Yola on October 4 for the boundary, a three days' march, and met the German Commission under Oberleutnant Detzner at Bayare, near Boundary Post 17, the last pillar of the Lake Chad-Yola frontier. The work of demarcation commenced on October 8, and continued without interruption for six months, during which time one hundred and sixteen pillars were placed in position.

Bayare is situated in a gently undulating plain, about 1400 feet above sea-level, watered by numerous rivers and streams, which, rising in the Shebshi mountains, flow north and west into the river Benue. The boundary across the plain is marked by a cutting through the bush 25 miles long, with a chain of pillars extending in a straight line from Bayare to a point on the M'Bulo river, where that river issues from the great mountain wall formed by the Shebshi group, the crest-line of which divides the Yola and Muri provinces.

The M'Bulo river itself would have formed the best natural boundary through this plain, but no suitable *quid pro quo* could be found, as an area of about 100 square miles of very fertile country was involved. The plain is covered with thin bush, and dotted with villages, each with its surrounding patches of cultivation. The formation is brown laterite, the rocks containing occasional bands and lumps of ironstone. From the general level rise isolated granite hills, the most prominent of which is a gigantic solitary rock called Lamja, which stands like a sentinel overlooking the boundary, nearly 3000 feet above the plain. This mountain is pear-shaped, the base being solid, but the whole upper part is built up of huge masses of granite, each as large as a good-sized house, piled one on top of the other like a pyramid of gigantic sugar cubes. The topmost rock is shaped like a parrot's beak, the northern face having a sheer drop of about 400 feet. The lower slopes are covered with pagan villages. Across the boundary, in German country, stands another great hill called Mungla, with three sharp-pointed spires. The most noticeable feature of all the mountains in this district is the extreme sharpness of the peaks and the concavity of the slopes. The smaller isolated hills in the plain are rounded lumps, covered with grass and small scraggy trees.

The people inhabiting the plain on both sides of the boundary are Fulanis, subject to the Emirs of Yola and Nassarawa; but the tops of isolated mountains and the narrow valleys between the long spurs jutting out from the Shebshi group, are inhabited by pagans, offshoots of the Chamba and Dakka tribes. The habits and customs of the Fulanis are well known—they are by nature herdsmen, just as the Hausas are born traders and the pagans agriculturists. The country is rich in flocks and herds of cattle, sheep, and goats. A large trade is also done in horses.

The villages consist of round huts, of sunbaked mud, with conical roofs thatched with dry grass. Sometimes, when the village is only intended to be temporary, the walls of the huts are made of zana matting, which is also used to enclose the compounds, or groups of huts inhabited by one

family. Every village has its assembly place, generally under a large shady tree, where the headman and his advisers sit all day and smoke while the slaves work in the fields or drive the cattle to pasture.

Slave-dealing is still carried on in this country, advantage being taken of the proximity of the boundary, which makes it so easy to evade justice.

Many of the carriers with our party were runaway slaves, and soon after leaving Yola we had much trouble with female slaves who had escaped from their masters and joined the headquarters of the expedition, where husbands and food were plentiful. Angry masters, mounted on fiery horses, used to arrive in the camp at all hours of the day and night, demanding their lawful property. The ladies were for the most part unwilling to return to the harem.

The work of marking the boundary was watched with the greatest interest by the Fulani population. The "kings" of all the towns on the English side, and a good many from the German side, came to salute us, generally bringing a present of a fowl or a basket of limes. Each "king" carries a long stick surmounted by a brass crown, the emblem of his office under the Government. There are first, second, and third class kings; the size of the crowns varies accordingly.

The boundary, after crossing the plain, runs along a narrow valley almost shut in by hills, following the upper M'Bulo river to its source in the Shebshi mountains. The line now crosses the so-called basalt plateau from point to point, passing over the summit of Mount Dakka, the highest peak in Northern Nigeria. The boundary pillar on this point is 5338 feet above sea-level. The plateau is really a long unbroken ridge, connecting a series of small undulating plateaux; at intervals along the ridge are high grass-covered cones. These hills are formed of granite and schists covered over with basalt and other volcanic rocks. Many of the peaks are weathered into sharp fantastic forms. The view from Dakka is magnificent. On all sides are tumbled masses of mountain, much cut up by deep ravines and rocky gorges, through which the many headwaters of the M'Bulo and Kam rivers tear headlong to the plains. On the German side, Vogel Spitz rises amid innumerable peaks and valleys to a height of nearly 7000 feet, overlooking some hundred square miles of still unknown country. The northern spurs, projecting into the Kameruns, enclose high tablelands, extraordinarily fertile and highly cultivated. On the British side, the plateau throws out steep, barren spurs to the north, the narrow valleys being inhabited by Chamba and Dakka pagans.

The boundary crosses the plateau near the only practicable pass, the road being entirely on the German side, so that one result of the demarcation is to close the direct trade route between the M'bulo and Kam valleys, until a new pass is discovered. There are plenty of tracks over these mountains, but very few practicable for animals. A bull which costs £1 at Tibak in the M'bulo valley is worth £3 or £4 at Gankita in the Kam

valley, the distance as the crow flies between these two places being no more than 12 miles.

The Shebshi mountains are interesting from the fact that they would form the principal obstacle, a well-nigh insuperable one, to the construction of a direct line of railway from Calabar, or a point on the Cross river, *viâ* Takum and Bakundi, to Yola. Yola is one of the few important points in Nigeria which does not appear likely to be linked up with the coast by a railway for many years to come. The German railway from Duala to the north, if it ever does reach Garua, will pass to the east of the Shebshis, where many obstacles, almost as formidable, will have to be overcome.

This wild mountainous region is still a practically unknown field for mining enterprise, and as part of the configuration of the eastern Shebshis is similar to that of the Bauchi plateau in Northern Nigeria, it seems not improbable that tin may be found there in paying quantities. Gold has already been reported to have been discovered in this district. The people inhabiting the Shebshi mountains and their foothills are principally Chamba and Dakka pagans. They have many points in common with other hill pagans of Northern Nigeria and Adamawa. The effect of Mohammedan inroads upon these tribes is especially evident. They may be divided into two classes, firstly, those who are slaves and mingle freely with the Fulanis, their villages being in the plain; and secondly, those who hold themselves aloof on the hilltops. The former have copied many things from the Fulanis, such as clothing, houses, etc.—almost everything, in fact, except their pastoral proclivities. The pagan will keep goats and fowls, but he will have nothing to do with horses and cattle.

It is with the hill-top pagans, however, that we are principally concerned, as nine-tenths of the whole boundary zone are inhabited by people of this denomination. The first sign of the lower stage of civilization is the absence of clothing. A tuft of grass is the national dress, and even this is often dispensed with.

The villages consist of little beehive-shaped huts of mud or grass, perched on apparently inaccessible heights, or cunningly hidden away in mazes of dense tropical vegetation. The inhabitants bear a great resemblance to monkeys, being small in stature, but extraordinarily active. The steepest and most difficult ascent over rocks and ravines is to them as easy as a straight, broad, level road. In fact, I have often noticed that these pagans, made to carry a load on the level, are utterly at a loss. They only come down from their rocky fastnesses to cultivate their fields, or to make war on their neighbours. They are armed with bows and poisoned arrows, from which it is never safe for them to be parted, even when working in the fields. They are almost invariably at war with a neighbouring village, the probable reason being that some of their women have been carried off. No regular trade is indulged in, but they are very fond of salt, which they obtain from Hausa traders. A bag of salt

which costs half a crown on the coast has a purchasing power of at least ten shillings in this country.

Each village is an independent community under a chief. The inhabitants are entirely ignorant of the world beyond the next village to their own. The nominal chief of the village has not, as a rule, as much influence as the local juju man or witch doctor, whose power over these extremely superstitious people is directly proportionate to his success in imposing upon their credulity. Any calamity, such as an epidemic of sickness or a sudden death, is always attributed to the evil eye, and some member of the community is at once suspected, and either killed or sold to passing Hausa traders. If a chief dies, the village always moves to another site. This partly accounts for the number of deserted villages and ruins found in the Shebshi mountains.

The Chambas are industrious agriculturists, and keep large numbers of goats and fowls in their villages. The farms are generally at the foot of the hills. After the harvest the people brew large supplies of spirit from the grain, and get drunk for several days together. These orgies generally result in fighting among themselves. The principal industry, besides agriculture, is working in iron. They make their own farm implements, spear and arrow heads, and pipe-stems.

The boundary-line descends from Dakka into the valley of the river Kam, and follows this river for 10 or 12 miles, leaving on the English side the small Hausa settlement of Gankita, a centre of the rubber-collecting industry. The Hausas, in fact, maintain a kind of sovereignty over all trade roads through this country. At the junction of the Kam with a small tributary from the east, the boundary leaves the river and runs from point to point over a block of rugged hills to the south. These hills form the fringe of a vast unknown tract of country in the Kameruns, the haunt of elephant, lion, bush-cow, and leopard. There are few villages on the hilltops; the inhabitants are wilder, the houses smaller and more squalid than those previously described. While erecting a chain of pillars on prominent peaks, a rapid plane-table survey of this country was made, and adjusted to several previously fixed points. The boundary now descends from the heights into the valley of the river Lumen, and a tract of country which previously belonged to the Kameruns is taken into Nigeria. Beyond its extreme beauty, this new area appears to be of little value. The country is practically impenetrable, and it was only possible to advance through it by sending a large party to cut ahead of the column.

The river Lumen runs for 20 or 30 miles under a dark arch of overhanging trees, the sky being invisible, and the water very cold, even in the heat of the day. We explored this river on rafts, made of waterproof sheets stuffed with grass, propelled with a pole. The disadvantage of this method was that, while it was easy enough going down-stream, it was necessary to cut a road along the bank in returning, the rafts being

useless against the current. The sands of the river are full of iron. Crossing the Lumen, the boundary again takes to the hills, following the top of a high ridge called Shina, pillars being placed on prominent peaks. The tops of all these mountains have evidently, in the past, formed the last strongholds of the pagans who were driven from the Kam valley by the Fulani or other stronger tribes; for near the summits there are often to be found a series of defensive walls, made of piled-up stones, the innermost ring being only a few yards in diameter, which seems to point to many a stubborn resistance. Whether the country was depopulated on account of conquest or of plague, it is difficult to determine, but judging from the number of ruins found, the fertile valley of the middle Kam must at one time have been densely inhabited. It is now entirely abandoned, except by great herds of antelope. Two mountains, Tukorua and Shekussum, form the last pillars of this high chain, which is a splendid natural boundary. The line now descends into a vast plain, which extends south and west to the river Teraba.

This plain is covered with thin bush, alternating with patches and belts of dense forest. At intervals small lumpy hills rise like islands from the general level. Of these the most prominent is called Maifula. This hill is geographically interesting from the fact that the eighth parallel of north latitude meets the eleventh meridian of east longitude on top of the peak. The boundary takes the form of a straight line cutting across the plain, leaving on the German side the Gongome people, who live in stockaded villages in the thickest part of the forest. The trees in the forest belts are of a great height. As the river is approached the ground becomes swampy even in the dry season. Here are the breeding-places of many kinds of biting fly, including the "tsetse."

Along the banks of the river Teraba are numerous Hausa and Jukum villages, through which pass important trade roads between Northern Nigeria and the Central Kameruns. The principal trade is in rubber, kola nuts, sheep and goats. There are no cattle on account of the fly.

The Germans have established a customs post at Karbabi, near the boundary, where they collect an annual tax of twenty-five shillings from every trader crossing the line.

The Teraba is a large river which rises near Kontsha, south of the Shebshi group, and flows into the Benue near Amar. It is navigable by steamers to Bakundi, about 20 miles from the boundary, in the rains, and by canoe to Karbabi in German country. Ten miles above the point where the boundary-line crosses it, the river becomes unnavigable on account of rocks and rapids. As this river is typical of all the great southern tributaries of the Benue, a short description of one of the upper reaches may not be out of place.

Fifteen miles above Karbabi, the river bends sharply at right angles, forming noisy rapids. Above the rapids the bed is rocky with deep pools. Under the tall trees along the banks are open glades like an

NEEDLE PEAK, KATSENA VALLEY.

A TYPICAL HILL.

JUJU HOUSE AND SECRET GRAIN STORE.

VIEW IN ZUMPERI HILLS.

English beech wood, entirely free from undergrowth, the ground being carpeted with soft moss. These are the feeding-grounds of huge herds of hippopotami, who live in the pools in the daytime. The river is here 200 to 300 yards wide, with high banks; the channel winds among huge boulders, forming a chain of pools, but leaving a narrow deep waterway among the larger rocks. The pools are like dark mirrors, silent and stagnant, yet bright and clear, reflecting the trees on the opposite bank in full detail. Wild geese and ibis fly overhead, whilst large alligators move about like torpedoes, with their noses out of the water, leaving long trails of bubbles on the surface.

There is no village within many miles of this place, and it was only with the greatest difficulty that we could obtain guides, as there are no tracks except those made by the larger game. The inhabitants of the pools were thoroughly startled at our approach. There seemed to be a sort of collusion between the different birds and beasts. The shrieking ibis warned the alligators asleep on the rocks in the sun, they in alarm slid into the water and warned the river-horse that something was amiss; the river-horse in his turn went pounding up-stream, under water, coming up to breathe at intervals behind the rocks and branches. The snorting was terrific. We estimated that there were between thirty and forty hippopotami in the largest pool. I have never seen a wilder-looking place; it seemed to be alive with everything except humanity.

The boundary, after crossing the Teraba, passes through the top of an isolated mountain called Kun or Beli peak. This is by far the most striking natural feature on the whole line. The base of the mountain covers an area of 10 square miles, and it rises in the form of a tetrahedron, to a sharp peak nearly 4000 feet above the surrounding plain. The upper slopes are clad with bamboo forest. From the top, on a clear day, 60 or 70 miles of the river Teraba may be seen winding across the plain, a bright band of silver against the dark green background.

The boundary next crosses the Gazabu river, a tributary of the Teraba, and ascends again into a hitherto unexplored tract of country in the form of a vast cup or crater, 25 miles in diameter, surrounded by a circular wall of mountains. This formation is a continuation of the Banjo highlands, and contains the headwaters of the Suntai or Bantagi river, a large affluent of the Donga. This river cuts its way through deep gorges, and the noise of its rapidly falling waters may be heard for many miles from the tops of the surrounding peaks.

Two of our party crossed this country along the boundary, travelling light with a few picked carriers. They suffered great hardships, and, owing to the thick harmattan, had to march entirely by compass. The interior of the crater was found to consist of deep ravines and numerous watercourses. The principal result achieved was the location of the main headwater of the Suntai, which, at the point where it is crossed by the boundary, tears through a deep rocky gorge, about 150 yards wide. This

river escapes from the circular wall of hills through the only visible outlet, near the village of Kwossa, on the English side.

The remainder of the two Commissions had to make a *détour* of 60 miles, to reach the point where the boundary-line emerges from the hills and drops from the edge of a high plateau into the plain of the Donga valley. This plain is gently undulating, with isolated hills, and like that of the Teraba, is covered with thin bush and forest belts. The water system is complicated, and was only determined with much difficulty. The trees along the numerous streams are of such a great height that they give to the gently undulating slopes the appearance of level ground, which often seems to be higher than the water-partings themselves, the latter being covered with relatively thin bush.

The inhabitants of this country are a mixture of Jukums and Zumperis, but there are numerous Hausa trading settlements. The principal "trade" is smuggling rubber and kola nuts into Nigeria without paying the German tax. The pagans live in "swallow-nest" villages on the heights, or on the crowns of low hills in the plain. They cultivate guinea corn and root crops. The village of Damia is a good example of the "swallow-nest" type. Perched on a ledge of rock beneath the edge of the plateau are numerous brown beehive-like huts, amid masses of greenery. All around is a continuous roar of falling water. Yams, cassava, and sweet potatoes grow in abundance in the interstices between the huts.

The boundary, crossing the plain, follows the Maio Tati, a small tributary, to its junction with the Donga river, near the deserted village of Gidan Sama. The river-bed is rocky, with a rapid current, and quite unfit for any kind of navigation at this point. Numerous tributaries on both banks form swamps in the dense forest at their junctions with the main stream. There is no doubt that many villages in this valley have been deserted on account of the biting fly which infest these thickets. The natives say that the Donga water is too "cold," and hurts the stomachs of men and animals. It is certain that prosperous villages in this neighbourhood have been depopulated by some kind of sickness. Here our horses began to sicken, and had to be treated with arsenic. The few cattle that we had brought from the north developed sores and died.

After following the Donga for 15 miles, the boundary ascends a tributary to its source in the Wanya mountains, a wedge-shaped block of hills. Amid these hills is a small tableland where are numerous ruins of large villages. According to the natives, many of whom are pock marked, whole towns have been decimated by small-pox within recent years.

On the top of this plateau are two prominent peaks known to the hunters and rubber collectors as the "Mountain of Death" and the "Mountain of Destruction."

The next plain traversed is that of the Gamana valley. Here the country begins to get much closer, and the bush very thick. Oil palms are first met with in this valley. The thickets along the Gamana river

are so dense, and the trees so large, that it was only possible to clear the undergrowth, and instead of a cutting, a causeway 6 feet wide of heavy stones was laid between the tree-trunks, to represent the boundary.

The country between the Gamana and Katsena rivers is inhabited by Zumperi pagans, who are cannibals and live on hilltops. They are of small stature, and remarkably repulsive appearance. Every other man appeared to be suffering from goitre or elephantiasis—whether the legacy of cannibalism, or the effect of drinking infected water, it is difficult to say. The people are industrious, and besides corn, grow large quantities of cotton and tobacco on the hillsides. They breed dogs for eating purposes, and all the villages are full of yelping curs, covered with sores like their owners. In one village a large deposit of human skulls was seen. The villages are well built and surrounded by mud walls and ditches. Among the numerous "ju-jus" found in the deserted huts was a grotesque mask, which was apparently kept to frighten the women. Any woman seeing it must die at once. When the community is short of meat, the local witch doctor puts on the mask and runs about the hills until he meets a likely looking victim, who is then killed and eaten.

The Zumperis are great hunters, and have killed off nearly all the game in their country except leopards. We saw an ingenious leopard trap, a heavy log suspended between two palisades, about 18 inches apart, the trap being baited with a goat. The tracks are full of pitfalls for animals, deep holes, with poisoned stakes at the bottom. The holes are covered over with sticks and grass, so as to look like a firm surface. The smaller antelope, once caught, cannot extricate themselves, even if they escape the poisoned stakes.

Along the banks of the rivers are numerous traps for bush-cow and the larger antelope: these take the form of poisoned spear-heads, hung from the branches of trees, over well-worn tracks to the waterside. The whole contrivance is very ingenious: the spear-head is fixed in a cross piece of wood, supported by two forked sticks, hidden in the trees. The point of the spear, which hangs vertically downwards, is dipped in deadly poison, and loosely wrapped in a leaf, so as to be practically invisible. Across the track is stretched a thong of creeper, as a trip wire, connected by another thong with a draw-knot in it to the suspended log of wood and spear. The unsuspecting bush-cow, going down his usual track to the water, touches the creeper stretched across the path with his forefoot, releasing the log and spear, which fall vertically on to his back. The slightest scratch means death in a very few minutes. The horns and bones of dead animals were found in many of these tracks.

The boundary through the Zumperi country, after crossing the Gamana river, traverses a plain much broken up by minor undulations, and rises sharply on to the rocky edge of a plateau about 2500 feet above the sea. This plateau is crossed in a straight line by a chain of pillars, placed on the tops of successive parallel ridges, which run east and west, and gradually

increase in height, until the Katsena valley is reached. The villages near the line were found to be deserted, the inhabitants having withdrawn further to one side or the other.

The Katsena is the last of the three great southern tributaries of the Benue. The valley is narrow at the point where it is crossed by the boundary, and shut in by high rocky mountain chains, with needle-shaped foothills. The reflected heat of the sun from the barren mountains on the north bank is very great. The river is navigable for light-draught steamers as far as Katsena Allah after the rains. Canoes are kept at most of the riverside villages near the boundary, but they are mostly used as ferry-boats or for fishing.

The Northern Nigeria-Kameruns section of the boundary being now complete, the Commissioners crossed the Katsena, and were met by Mr. Hives, the District Commissioner of the Obudu District, Southern Nigeria, and Lieutenant Webb, with thirty Yoruba soldiers. The Hausa escort returned to Yola. The German escort was increased to fifty men, as Oberleutnant Detzner anticipated trouble with the N'diri people further along the line, who, besides killing a runner, had been sending threatening messages.

South of the Katsena, the country is much split up by parallel ranges of mountains, running north and south, instead of east and west as hitherto. The intervening valleys contain large rivers, the most important of which is the Imba, which forms part of the boundary. From the south bank of the Katsena, a cutting was made through the bush to a point on the small river Wom, near the German customs post at Gaiama. The boundary now follows a river line for about 40 miles, between the parallel ranges which enclose the narrow valleys of the Imba, Maquari and Morn rivers. This country is practically uninhabited, but is frequented by hunters and rubber collectors. The bush swarms with game, and after the grass is burnt, great herds of antelope may be seen from the hilltops. Near the junction of the rivers Wom and Imba is a brackish pool or salt lick, where all kinds of animals congregate in the early mornings and late evenings. In the mud around the pool are countless tracks. From a clump of trees a few yards away it is possible to watch the herds approach. On a bright moonlight night, this is a sight well worth watching. Close to the water grow some beautiful purple ground orchids.

The Imba river is deep and unfordable, with a fierce current. Rising far in the Kameruns, it falls rapidly through a series of rocky gorges and empties itself into the Katsena at Ngadi. The natives call this the "Devil" river, owing to the violent current. Ascending this valley, the boundary crosses a small watershed and enters the country of the Agara or Misa Munchis, which is a plateau with steep undulations, numerous hills and lumps rising from the general level. These hills are full of magnetic iron and are covered with short grass. They appear to be frequently struck by lightning. The streams are very numerous and

thickly wooded, the trees being in January a bright scarlet colour like the maples in Japan.

The people inhabiting this district are a branch of the large and powerful Munchi tribe, which is subdivided into clans, those near the boundary being the Itu-avas, Inju-avas, and Iturubus. The Munchis have kept themselves free from contamination with the surrounding lower-class tribes, by whom they are greatly feared. The Munchis of the plains are of good physique and very intelligent, but those met with in the hills are physically and mentally inferior, and have evidently been driven to their present settlements under the law of the survival of the fittest. In their turn they have driven the other adjoining tribes of still lower class further into the hills, and taken possession of their land.

The Munchis are supposed to have originally come from a country called Para, somewhere north of Yola, where they were a vassal tribe of slaves belonging to the Fulanis, whose herds they tended. More than two hundred years ago, they are said to have become so numerous and independent, that they broke away from the Fulani yoke and became a powerful tribe, which has now spread from both banks of the Benue, south-west as far as the Aiwa river, and well over the German boundary to the south. Though commonly known as Munchis, they still call themselves Paras among themselves. Their present name appears to date from the time of their secession from the Fulanis, who, when they found that their slave herdsmen were getting independent and wandering too far afield, sent repeated messages telling them to come back and bring the cattle. No notice was taken of these messages, and the bearers were beaten and sent back. Hausa messengers were next sent to demand the return of the cattle. The reply sent back was "Mun chi." "We have eaten" (*Hausa*). The Fulanis then sent a punitive expedition, but were forced to retreat with heavy losses. Since that time the Munchis have retained their independence.

They have often been compared with the Zulus, many of their customs being similar. The majority of their laws are identical with the old Levitical laws, and are said to have been framed by Kuroka, a powerful chief, some hundred years ago. Their villages, unlike those of most other West African tribes, are well built and clean. The men are brave in war and industrious in peace. They have always kept aloof from other tribes, with whom their women are not allowed to intermarry. Several cases are known, however, of Munchi women being sold as slaves to Hausas, but it is probable that these were either bad characters or of weak intellect, and that this was a convenient way of getting rid of them. Their marriage customs are peculiar to themselves. In addition to the usual marriage by payment of a dowry, a still more common form is by exchange of sisters, daughters, and sometimes wives; but these exchanges are nearly always made between clans or sub-tribes residing a long way apart. Polygamy is rife: the dowry of a young girl is usually two cows,

but in the case of a widow or elderly woman, one cow or its equivalent, or even less, is considered sufficient.

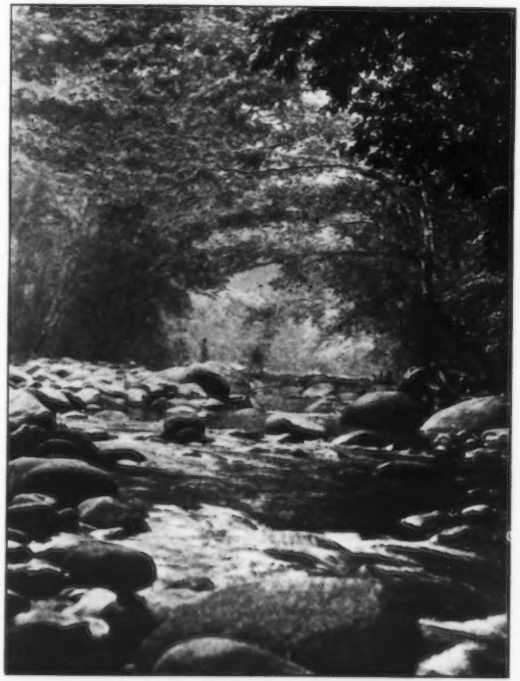
The Munchis are of striking appearance. Those near the boundary are poor and wear few clothes. They go in for extravagant hairdressing, the most popular coiffure being a shaven head with one or two balls of hair left growing. Others wear their hair in beaded strands, falling over the side of the face. The tribal markings are a number of raised tattoo marks, in the form of a crescent, on both sides of the temple. These are universal, and are compulsory for both sexes, but the marks disappear in old age. Other markings are tattoed stars and rings on the forehead, chest and back, but these are all optional. The two front teeth of the upper jaw are filed into V-shape.

The Munchis are excellent farmers, and grow guinea-corn, yams, millet, beniseed, maize and ground-nuts in large quantities. They also cultivate cotton, from which they weave good cloth, dyeing it with indigo, which is grown round every compound. Each village has at least one public dye-pit. Tobacco is also grown, and is either used as snuff or smoked in large pipes with bowls of clay and stems of smelted brass.

They are clever workers in wood and iron, making chairs and stools, in the carving of which they display some art and much ingenuity. The iron ore found locally used to be smelted in large quantities, and the remains of old workings can be seen in many places, but trade iron bars are now more generally used: from these spears and arrow-heads, hoes, knives, and daggers are constructed. The small knives are curious in shape, the handles being iron loops, which fit over the palm of the hand. The hoes have broad, heavy blades, fitted into short, crooked wooden handles, and are most effective agricultural implements. The principal weapons of offence are bows and arrows, the arrows being poisoned with a compound of crushed and boiled strophanthus seeds, snakes' heads, and poisonous plants, etc., which when freshly made is very potent, the slightest scratch causing a man to die in agony in twenty minutes. The fumes from this poison, when it is being boiled, are very deadly, even in the open air. The mixing is always done by one of the numerous ju-ju men, who profess to have antidotes, both external and internal, but there is no authenticated case of a cure having been seen by a European up to date.

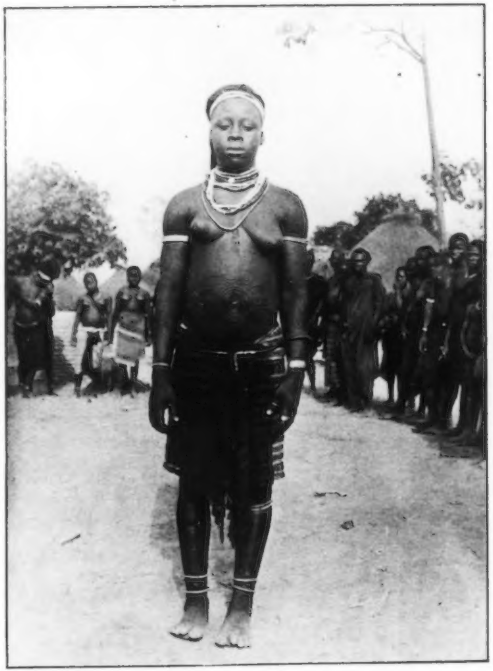
In every village there is a large war drum, constructed from a hollowed-out log, over which is stretched a hide. The Munchis are expert in the use of these drums for signalling purposes, and messages are sent in code from village to village throughout their country with great rapidity and accuracy.

They are very fond of dances and plays, which, accompanied by songs, are held on the occasion of the death of a chief, or the headman of a compound, also at births and marriages. These dances are often kept up for several days, when the host is rich enough to supply the food and drink, the latter being an intoxicating liquid distilled from guinea-corn.



RIVER MAHANA.

PUTTING IN A BOUNDARY POST.



MAUCHI GIRL.

DAKKA PAGANS.

About a hundred and fifty women of the Iturubu tribe danced for us, forty of them being the wives of one chief. The principal wife, a very old woman, was studded with beads, some of which were the size of a golf ball. They were all hideously ugly, but possibly the more attractive ones had remained at home. The dances showed a great idea of time, if not of music.

All the Munchis met with were perfectly friendly, and besides clearing camps and building houses for the Commission, brought in large quantities of supplies.*

The boundary leaves the river-line in the Iturubu country, and runs in a straight line across the hills to the junction of the Amiri and Mahana rivers, following as far as possible the tribal boundaries. These two rivers are of extreme beauty, the banks being steep with magnificent trees branching overhead. The Amiri descends rapidly from the mountains, and forms a series of deep clear pools full of large fish. Long ribbon orchids hang from the branches over the pools. The surrounding country is open grassland, and the prevalence of a yellow ground orchid gives the landscape the appearance of English meadowland full of buttercups.

The Amiri river forms the international boundary as far as its source in the high mountain range, which is the watershed between the Benue and the Cross river. Looking at this range from the north, it appears to be a continuous ridge, between 5000 and 6000 feet above the sea. Long grass-covered spurs project from the main ridge at right angles, the intervening valleys being thickly wooded. Small villages are perched on every col, and there are extensive yam-fields on the slopes. The road up the Amiri valley passes through the villages of the Olitti and Atcho people; these villages are large, with roomy, massive houses in small stone-walled compounds, protected with loopholed thorn palisades. The people are armed with guns, and had threatened to resist the passage of the boundary commission. As a matter of fact, there was only a passive resistance. The road over the pass ascends and descends one spur after another, crossing small lateral valleys full of oil palms. At a height of 4000 feet open grassland is reached, and the Amiri is left far below in a deep ravine. The road, still ascending, winds round a high grass peak, and descends on to a small plateau. After no less than five separate ascents of 2000 feet, with alternate descents of nearly half as much again across the intervening ravines, the main ridge is reached, and the path follows an almost razor-like divide, which is part of the main watershed, and is about 5000 feet above sea-level. The view from this place far surpasses anything I have yet seen in Nigeria. To the north and east, as far as the eye can see, stretches the open grassland, with range upon range of blue mountains

* The above information was collected by me from the natives themselves, with the assistance of Mr. Hives, the Political Officer attached to the Commission, who has spent many years in the country, and is compiling a work on the history and customs of the Munchi tribe.—W. V. N.

in the distance. Across the plain sweep parallel shining rivers, disappearing through gaps in the hills to the north. To the south and west, the great forest-clad plain extends to the Cross river, whose valley 40 miles away is marked by a long bank of clouds. All around is high tableland, cut up into small plateaux by numerous ravines, down which countless streams tear headlong to the plains.

The main watershed runs north-west, and is flanked at right angles by the Sonkwala mountains, 15 miles within British territory. These peaks are over 6000 feet in height, and overlook the narrow valley where severe fighting took place in 1908, the combined Boundary Commissions, under Colonel Whitlock and Oberleutnant von Stephani, being attacked by the natives.

At that time all the existing maps showed this place, Sonkwala, to be actually on the provisional boundary-line, and the road through the valley to be the only practicable route over the watershed. The people are truculent to this day, and the present Commission was screened from their attentions by the interposition of a strong patrol.

The main plateau is cut in two by the valleys of the Amiri and Makwai rivers, the headwaters of which spring from this razor-like divide. A better natural boundary could hardly have been devised, for the one reason that it is almost, if not quite, impassable. The plateau bears a strong resemblance to the Sussex Downs, being greatly undulating and covered with thick, short grass. Mr. Hives, who has had much experience of cattle raising in Australia, considers this an ideal place for the purpose.

Descending from the plateau to the south, the forest line is reached at about 4000 feet above the sea. Here the road plunges into darkness, descending a tree-clad precipice. After a slippery descent of about 2000 feet, the first villages of the Anyangs are reached. These people are of an entirely different type from those north of the watershed. They are almost invariably at war with the nearest grassland people. Their villages are hidden away in the forest, and consist of long, low, rectangular mud houses with roofs of palm-leaves, on either side of a squalid street. The people are very poor, and live almost entirely on plantains, their farms being in small clearings, widely separated. Pigs are kept in large numbers in the villages. Further south, the people met with are Bokis, who extend to the Cross river. Their habits and customs are well known.

The boundary through the forest is marked by pillars on the cross-roads; the positions were fixed by pushing the perambulator measuring wheel from known points, as it was not possible to see any hills.

The people of each village cleared the roads for us as far as their own boundary. The village boundaries, although in dense forest, are well known to the natives, who are extremely jealous of their rubber collecting rights. Every man carries a matchet, and they are very handy with this implement.

No guinea-corn grows south of the watershed, much to the disgust

of our Hausa and Fulani carriers, who refused to eat plantains, and had to be fed on rice, which was sent for from a trading store on the Cross river. The experiment of taking these natives of the north into an entirely new country, such a great distance from their homes, was otherwise a complete success, and many of them were so impressed with the trading possibilities of the country, that they wished to remain in it.

The geological structure of the boundary zone, taken as a whole, presents few features of interest. The rocks are entirely crystalline and igneous; there are no specimens of the cretaceous and tertiary rocks, which are known to have a large development in parts of Southern Nigeria and the Kameruns. Traces of tin were found in some of the rivers flowing north from the watershed of the Cross river and Benue system. As these were accompanied by small quantities of tourmaline, and the watershed plateau itself consists partly of kaolinised granite, which often goes with tinstone, it seems likely that this mineral exists in the neighbourhood. Nearly all the rivers crossing the boundary contain traces of monazite, which mineral seems to be rather characteristic of the whole district.

The line of the watershed between the Benue and Cross river systems divides sharply the boundary zone into open bush country and dense forest. North of this watershed, the whole surface of the country is covered either with long grass or thin bush, with occasional belts of forest along the streams. These belts are the most distinctive feature of the landscape. The Hausas call them "curmi," the Germans "Galleriewalder." Looking down from the hilltops into the plains, the whole water system is easily traced by the surveyor, as the trees along the streams remain a brilliant green, even at the height of the dry season, when all the intervening country is parched or blackened by fire.

North of the Shebshi mountains, the smaller streams are generally bordered by grass, and are not so easily distinguished. Here also the bush is much thinner, the trees smaller and more distorted, being an easier prey to the long lines of fire which rush through the bush during the annual grass-burning. South of the Shebshis, the bush is thicker, the trees taller, and the forest belts denser; the reason being that, the country being better watered, the moisture never entirely evaporates, even in the dry season, and the fire is unable to get any hold on the grass or bush anywhere near a stream.

Along the Donga and Gamana rivers, the "curmi" is often half a mile in depth. Here the fire attacks the grass in patches, stripping the blades, and leaving the stalks in the shape of thick half-burnt canes, which seem to gain in strength as they take on new verdure each year.

The "curmis" are mostly full of vine rubber (*Landolphia*). Tree orchids are also found in great profusion, the commonest being the long ribbon species. The seeds appear to be brought by the south winds, and cling to the damp bark of the trees during the rainy season. The red spiky lily (*Hæmanthus Katharinæ*) is common in the bush, but it does not

grow to such a size as the specimen from Natal at Kew. There are also numerous ground orchids, the commonest being a mauve variety about 6 inches high. This grows generally under trees, amid decayed leaves and grass. On top of the mountains and high plateaux, the grass does not grow very long. The hollows are filled with clusters of trees kept a brilliant green by perennial springs. On the boulders above the 4000-foot level are various kinds of rock orchids.

Turning now to the forest country south of the Benue-Cross river watershed: the forest line is sharply defined and follows approximately the 4000-foot contour on the southern slopes. The forest extends without a break to the Cross river, and from there to the sea. The trees grow to a great height, and it is possible to march for hours without seeing the sun. The undergrowth, on the other hand, is less thick, as there is no long grass, and roads are more easily made, but they have to be cleared at frequent intervals, otherwise they quickly become choked by weed and barred by fallen trees. The atmosphere is damp, and there is a heavy oppressive scent. All through the rains great banks of fog sweep up from the south, clinging to the treetops.

The whole of this forest abounds in valuable timbers, such as ebony and mahogany. Many of the latter trees are of great girth. The oil palm, the most valuable product of Southern Nigeria, grows here in wild profusion.

The rainfall is greater in the boundary districts than in most other parts of Nigeria. The rains begin in March, with a few violent tornadoes in the hills, which become more frequent and less violent in April and May. From May to September, heavy rain falls almost every day. By the end of September the rivers are in full flood and mostly impassable, large tracts of low-lying country are under water, cutting off all land communications between the Niger-Benue system and the boundary districts. In October the steady rain ceases, and is followed by more tornadoes, which finally stop about the end of the month, when the dry season sets in, scarcely a drop of rain falling for a period of five months, after which the April tornadoes begin again.

The temperature is at its lowest in January and February, when the "harmattan" wind blows steadily from the north-east for several days in succession, filling the air with minute specks of sand from the desert, and obliterating the whole landscape with a cloak of fog, which varies in density according to the wind. This fog is noticeably less dense on the tops of the mountains.

North of the watershed the principal crops are guinea-corn, millet, ground nuts, cassava, and sweet potatoes; cotton and tobacco are also cultivated by the Chamba pagans, Zumperis, and Munchis. The corn is planted in April at the end of the rainy season, the method of cultivation being as follows. The ground is first cleared of weeds and the remains of the last year's crop. It is then prepared for sowing by digging shallow trenches

with a rough kind of hoe, the earth being piled up to form ridges between the trenches. Guinea corn (*Sorghum vulgare*), the staple food of the country, is planted in these ridges. It grows to a great height, often 15 to 20 feet, and is harvested in November. Millet is planted in the furrows; it ripens rapidly and is harvested in July. Cotton is ready for picking after December; tobacco and cassava are cultivated during the dry season on the hillsides, the streams being used for irrigation.

From October to March, during the dry season, the natives are engaged in stacking their corn into mud-walled granaries, and threshing what they require for immediate use. These months are also spent in repairing the damage done to the villages, grass being cut and tied into bundles for thatching roofs, and making new zana matting. The dry season is also the hunting season, when the long grass has been laid low by fire. This grass burning is an annual institution, although the Government has given orders prohibiting it, on account of the damage done to trees. But the hill tribes care very little for trees or grass, and a good deal for meat. So a few weeks after the burning, when the blackened ground becomes carpeted with soft green shoots, the hunter sallies forth with bow and arrows to the well-known haunts of game, where by careful stalking or lying in wait he gets near enough to flick his poisoned shaft, and then follows up the stricken quarry until it dies in its tracks.

Most of the animal life common to the rest of Nigeria was met with in the districts adjoining the boundary, the principal exception being rhinoceros and giraffe, which do not appear to exist south of the Benue river. There are now few elephants left in the hills south of the Katsena. They appear to have moved further east into German country. Bush-cow are very numerous, especially on all the high grass plateaux.

The rocky hills in the Kam valley and in the Zumperi country are infested with leopards. The valleys of the large rivers crossing the boundary are alive with kob, hartebeeste, and waterbuck. Other species of antelope, such as roan, reed-buck, and bush-buck, are less common. Warthog, bush-pig, and several kinds of duiker are frequently met with. The upper reaches of the Teraba and Donga rivers are exceptionally full of hippopotami, as many as thirty having been found in one pool. They do much damage to the crops belonging to some of the riverside villages.

Among the smaller animals are several different kinds of wild cat. The black and white colobus monkey was seen in one place only. Other monkeys ranging in size up to baboons are common. Several python were killed, the average length being about 12 feet.

As regards birds, the sandy reaches along the banks of the larger rivers abound with crown birds, marabout, and egrets. Bustard were seen, but are rare. Guinea-fowl and bush-fowl are numerous near the farms. There are many fish in the rivers; they are mostly too bony to be edible.

There are practically no mosquitoes along the whole of this boundary, but "tsetse" fly are common in certain definite areas, which are well known

to the natives. The small sweat flies gave us more trouble than any other kind. In many places it was necessary to keep continually lighting fires of damp grass and leaves, the smoke from which kept them out of our eyes while working. They are said to be a kind of miniature bee, and make very good honey. They appear to be more troublesome after the annual grass burning, the fire having dried up the leaves on which they live in the rainy season.

On April 4, 1913, the two Commissions reached Obokum, the British customs station on the upper Cross river, a picturesque riverside village surrounded by waterfalls. The last pillar was placed at a bend of the river, about 2½ miles above this place. On April 12, the maps and agreement were signed and the two parties separated, after having worked together for more than six months without a single point of difference. The whole demarcation had been carried out on the give-and-take principle, within the limits laid down, neither side gaining or losing any appreciable amount of territory. Lieutenant Kyngdon and Doctor Lobb returned by the shortest road to Ibi in Northern Nigeria, to pay off the Hausa and Fulani carriers, who could not be left in a strange country. The remainder of the Commission proceeded to Calabar, a distance of 250 miles down the Cross river, while the Germans marched to their railhead in the Manenguba mountains, a twelve days' journey, on their way to Duala.

It is hoped that this demarcation will be final, and that this, the least-known and most mountainous frontier in West Africa, which has taken so many years to determine, is now permanently established.

There should be no local frontier difficulties, as the officials on both sides are now furnished with an identic map, whereas hitherto they have had no maps at all.

As regards the country taken as a whole, I am bound to say that it exercised over us an extraordinary fascination, stronger even than the well-known "call of the coast." While allowing for all the hardships and discomforts inseparable from mountaineering in the tropics, there still remains that indescribable "glamour" which is always associated with a mountainous frontier. A natural borderland lies among these long blue ranges with their sharp-pointed peaks and untrodden valleys, amid great silent open spaces, and illimitable areas of virgin forest.

Major LEONARD DARWIN (Vice-President, before the paper): Those who attend our meetings regularly know how often we have received valuable information from those who have taken part in various boundary commissions. Whether we are to be congratulated as a nation for having so many miles of frontier in tropical countries which march with the territories of other great European nations may perhaps be questioned. But at all events it has this advantage, that it gives opportunities for these boundary commissions, from which we have acquired so much knowledge. Boundaries between two states are apt to run over countries which neither party especially desires, and therefore which are rough and unknown. To-night we are going to hear about the

commission which laid down the boundary-line between British Nigeria and the German Cameroons, from the Chief Commissioner, Captain Nugent, whom we are very glad to welcome. He is an officer of wide experience, for he served on the previous expedition as Assistant Commissioner, when Major Whitlock of the Engineers went over somewhat the same route in a preliminary survey. And besides that, having travelled in China and other countries, we shall listen to anything he has to say with great interest.

Sir CLAUDE MACDONALD: I have ventured to ask you to listen for a few moments, because I was a member of that original commission twenty-five years ago which Captain Nugent mentioned at the commencement of his lecture, which in the first instance drew out the provisional and original boundary between old Calabar and Yola, dividing the Cameroons on one side from the Niger Protectorate on the other. In those days we just took a blue pencil and a rule, and we put it down at Old Calabar, and drew that blue line up to Yola, and that is the boundary which Captain Nugent has described to you so charmingly and in such detail this evening. This was in 1889, and the same year I was sent by my old chief, the late Lord Salisbury, and the authorities of the Foreign Office, up the Niger river. I went as far as Yola. I recollect thinking, when I was sitting having an audience with the Emir, surrounded by his tribe, that it was a very good thing that he did not know that I, with a blue pencil, had drawn a line through his territory. The following year I was sent to Berlin to endeavour to get from the German authorities some sort of modification or rectification of the blue line, and the instructions which I received on that occasion—but perhaps I had better not detail them—but vaguely they were, I was to grab as much as I could. I was also provided at that time with the only map—the same map on which we had drawn the blue line. That was nothing more or less than a naval chart! It had all the soundings of the sea very carefully marked out, but the whole of the rest of the sheet was white! There was certainly one thing there, and that was a beautiful river called the Akpayaff, which started near the Calabar river and meandered for about 800 miles on the map. It was about the size of the Amazon, and the idea was that that was to be the boundary—the German one side and the English the other. When we came to close quarters with the Akpayaff river we found there was no such river. There was a river, but so far from being 700 miles long it was only about 3½. We are all very grateful to the lecturer for the charming lecture he has given us, and I beg to thank you for the kind manner in which you have listened to my remarks.

Major WHITLOCK: I should like, if I may be allowed, to congratulate Captain Nugent on having so successfully put the finishing touches to a piece of work we started together. I think he is rather pessimistic about the railway from Calabar to Yola, as if it ever gets as far as Takum and Bakundi (I suppose it will go *viâ* Umbagi over the hills) there should not be any difficulty in bringing it thence to Yola, keeping to the low ground west of the Shebshi mountains. In 1903 I trekked from Ibi to Yola, traversing some of this country, but I do not remember meeting with any obstacles that a railway could not surmount. As regards his remarks about the harmattan, when I was in those parts I was continually on the look-out for the deposit of sand on my boxes, etc. North of the Teraba river I usually found it, but in the country to the south I noticed that the covering consisted chiefly of carbon, rather pointing to a deposit made by the burning of the grass, which takes place about the same time as the harmattan season begins. There were also times when during the night there was not a breath of wind, yet in the morning there was the harmattan, and work

had to be suspended till it cleared. With conditions such as these it is difficult to understand how the atmosphere can so suddenly become charged with particles of sand which have travelled from the north, and I cannot help thinking that in the southern part of Nigeria the burning of the grass has a great deal to do with the apparent presence of the harmattan. There is only one other point, and that is, I am very pleased Captain Nugent showed on the screen and spoke about a slide made from the only map which was in existence when the original Boundary Commission went to Sonkwala valley. Prior to its receipt the only knowledge we had of that part of the country was a chain-dotted line drawn at the correct azimuth representing the boundary-line, with no detail at all. As, unfortunately, there appears to have been an impression that we had no business in that part of the country, and that our reason for going was to look for trouble, I hope after what he has said that this idea has been effectively and finally dispelled.

Captain RUXTON: The only reason I have for addressing you here to-night is that I have been in charge of that country that has been so ably described by Captain Nugent for the last ten years or more, and I can say that his description of the country is as accurate as it possibly can be. I should like to say one word about that famous blue pencil mentioned by Sir Claude Macdonald. It fell to my lot in 1901 to have to tell the Emir of Yola that his kingdom was divided up between ourselves and Germany; he would retain one-third, and the Germans would take the other two-thirds.

Mr. F. HIVES: I have little to add after hearing the graphic description given by Captain Nugent. He has touched very lightly indeed on the difficulties that the Commission had to face in going through the country. There was no less, at times, than two hundred carriers, for which food had to be provided, and at the time it had to be carried on the natives' heads. About the orchids which Captain Nugent mentioned, I may say that about three hundred varieties are being grown by a friend of mine, and they are all now growing splendidly. There are several varieties, but there are a tremendous lot more not known.

Colonel CLOSE: I think we have listened to a singularly excellent lecture. Having listened to a lecture by Major Whitlock a year or two ago and one to-night by Captain Nugent, and having spent a good deal of time at the War Office over the maps of this country, I feel almost as if I had been along the frontier. I have been at the south end of this frontier at the rapids of the Cross river, and that locality was shown in Captain Nugent's last photograph. When there we were told that there was a sort of promised land to the north of us, but I gather from the photographs and the description of Major Whitlock that the country is by no means of that character. I think that the blue pencil line that Sir Claude Macdonald referred to was on the whole a very happy one. It is a natural frontier region which cannot be easily traversed, and the curious thing is that in Africa so many of our frontiers have been happily chosen. Although largely haphazard, as a rule, the African frontiers are a success. Except to express my feeling that we have not only listened to an excellent lecture, but we have been given a very good map, and to express the hope that Captain Nugent's diagrammatic sketches will also be reproduced, I have nothing more to add.

Major DARWIN: When I was at the War Office I had to deal with this region of Africa, and I remember well what a particularly interesting part it was to study. Many of us are apt to forget for how short a time we have known the main geographical features of this part of the world. One hundred years ago

the outlet of the Niger into the sea was utterly unknown, and we have not yet celebrated the centenary of that discovery by Lander in 1830, which was the first step towards the opening up of that whole region. Then followed the expedition undertaken by Laird, which I only mention on account of one circumstance. There were forty-nine white people on that expedition, and out of that forty-nine, forty died. The next expedition was almost as fatal, and these facts show what an extraordinary change has taken place in the way expeditions are conducted. Also in those early expeditions there was nearly always trouble with the natives, whilst now there is practically none. I think our officers are much to be praised for the way in which they now conduct these expeditions, almost without any loss to themselves on account of fever, and hardly ever with any trouble with the natives.

PHYSIOGRAPHICAL NOTES.*

By G. W. LAMPLUGH, F.R.S., F.G.S.

II. On the Taming of Streams.

In the course of my field-work in the rural districts, I am constantly struck with the effect of human culture upon the streams. Hardly in any particular has Man in a settled country set his mark more conspicuously on the physical features of the land.

In uninhabited regions the rivers are wayward and restless, ever shifting from place to place within the bounds of the valleys, that are theirs to sprawl across at will. If a flood should heap up a bar in the channel; or fallen timber gather into a dam; or swamp-vegetation block the fairway in a sluggish reach; the stream swings easily aside into a fresh course. In a new country the tangled swampy bottom-lands of the valleys are the most difficult of all to traverse. It was so with the valleys of Britain at the beginning of human occupancy, and this explains why the oldest roads of our country so often take an ill-graded way instead of the apparently simpler and more direct course along a valley.

But as soon as a country acquires a settled population this unstable habit of running water is corrected. For many reasons, human interests demand that a stream shall have a fixed course. When tribal or individual ownership of land was established, the rivers and streams often afforded the best natural boundaries. The convenience of sites chosen for dwellings depended upon the constancy of the waters; and every cattle-enclosure required a permanent drinking-place. Even the smallest brooks thus came under the influence of proprietary rights that were exerted to restrain the stream to the convenient channel and to curb its natural waywardness.

---

* For No. I. of this series, with a short Introduction stating the scope of these "Notes," see *Geographical Journal*, vol. **34**, July, 1909, pp. 55–59.

In effect, the control was in most cases first established on the brooks, and was extended gradually from them to the larger streams and rivers.

If we take a sheet of the Ordnance field-map, on the 6 inch = 1 mile scale, for any part of Britain where the land is enclosed and cultivated, it is generally easy to pick out the track of natural drainage by the arrangement of the field-fences, even in areas where the surface-relief is so gentle that the wide-spaced contour-lines afford little direct aid.

For convenience of cultivation it is necessary that the fences be kept as nearly straight as possible; but, through the network of more or less rectilinear fence-lines shown on the field-map, one usually finds, here and there, a continuous winding boundary against which the straighter lines terminate in field after field. These snaky lines mark the oldest fences, and in most cases they follow the original courses of little brooks, now often artificially entrenched. The fence is arranged to cross the runnel repeatedly, in order that the fields on both sides may have access to the water; and usually the fence forms a boundary between different farms. Consequently, every loop and twist of the original channel participates in the agronomic scheme, and is maintained in its proper place by artifice. The ditch is periodically cleared, and by the same operation its banks are raised and strengthened, until the natural habit of the brook is brought under control almost as completely as are the natural habits of the domesticated cattle in the fields.

Sometimes, in districts of advanced agriculture, one finds that the process has been carried still further. All the old fences have been cleared away and the fields laid out anew to meet modern requirements; while, to suit the new scheme, the old stream-gutters have been abolished because of their inconvenient irregularities, and their brooks diverted into straight artificial trenches alongside the fences. In such cases, of which there are some good examples in the southern part of the Wirral peninsula in Cheshire, there may remain little trace of the original drainage-lines, except the partly obliterated dells that may be recognized here and there in the midst of cultivated fields.

Streams of a somewhat larger size, possessing continuous strips of flat alluvium in their valleys, have next come under the controlling influence. These are generally recognizable on our 6-inch maps by the continuation of long narrow fields in a sinuous belt across the network of straight fences. When cultivation began, the "bottoms" were doubtless in the condition of the present Canadian "muskeg," all swamp and tangled thicket; and they were left awhile untouched, the enclosures being carried down the drier slopes to their edges on both sides. With the gradual clearing of the scrub, these "bottoms" became of use as rough pasturage or meadow during the drier months; and they have occasionally remained in this condition to the present day, with the stream still meandering in comparative freedom within the bounds of the strip. More often, however, the reclamation has been completed by the confinement of the stream to

a fixed channel, usually of artificial construction, alongside one of the lateral fences, thus allowing cultivation to be extended along the strip except in a few waterlogged places.

In the case of the bigger streams, such as are represented by double lines on our field-maps, the influence of artificial control is even more strongly apparent on the enclosure-boundaries, and takes diverse forms. By long-continued effort the valley flats have been secured for cultivation; and where the stream has sufficient gradient it has been diverted or impounded at short intervals for various purposes, sometimes for the irrigation of water-meadows, sometimes to feed ornamental waters, and most often to yield power to the small water-mills still abundant in the country districts. Up to a certain point, one may say, the stronger the stream, the stronger the proprietary interests by which it is bound, and the less natural its career now is. Even in mountainous countries, the torrents are restrained, often at great cost, as soon as they reach the zone of habitation, while in the settled lowlands everywhere, the present stream-channels are in most cases almost as artificial as the canals by which they are frequently replaced.

It is interesting to notice, also, how completely a stream may be obliterated by the growth of a large town across it. One may often follow, on the field-map, the course of a brook from the open country to the confines of a town and there lose every trace of it; and even its valley, if originally shallow, may also disappear. The running water is enclosed within a conduit, the valley-slopes are graded, and the town spreads unimpeded over the site of the forgotten stream. Most of our big cities have exemplified this process, and its successive stages may be traced in many of the smaller towns.

The main rivers have naturally offered longer resistance to human interference, and the labour of curbing them has been arduous, taxing the collective and continuous efforts of the largest communities. Their present condition in different countries serves, indeed, as a rough index to the stage of human advance or to the duration of close settlement. Most of our own rivers, relatively small and easy to deal with, are banked out from their former flood-plains so thoroughly that we count it a catastrophe when they happen to spread themselves a little after their old habit. The interests of agriculture, navigation, manufacture, habitation, and the like are united in requiring that, however powerful the river may be, it shall, if possible, be held as strictly in restraint as the brooks.

But it is only in modern times that this control of the larger streams has been obtained; and we may often find proof in our maps of the wandering of rivers since the establishment of the present civil boundaries, as is shown where detached bits of a parish or county with a riverine boundary are cut off by the river through a change of its course. Some good instances of such changes in the lower Trent were described not long ago in this *Journal* by Mr. B. Smith (vol. **35**, May, 1910, pp. 568–579).

The general result of Man's interference is the same with the main rivers as with the tributaries; the stabilized channels are reduced in width and rendered deeper and more gutter-like; the fordable places grow steadily fewer and are replaced by bridges; and the gradient is curbed by artificial constructions tending to produce an equable flow.

Last of all, and not until civilization is far advanced, the estuaries are taken in hand; and here the changes due to human effort reach their greatest scale. Huge embankments or walls are raised to confine the tidal waters and to hold the river to a steady course, whereby wide areas of the old tidal flats are added to the habitable land. Hence, in our own country, the original aspect of most of the estuaries has been so radically altered during historic times, that it is only by a careful study of the early records and maps that we can retrieve the former distribution of land and water.* In these tidal reaches the requirements of the great ports become paramount, their very existence depending upon the maintenance of the established channels.

On this mention of the ports, it is worth digressing to refer briefly to another physiographical consideration affecting them. Obvious enough, though never regarded as of practical moment, is the fact of their absolute dependence upon the continuance of the sea-level at its present plane. A change of level to the extent of 20 feet or less, either upward or downward, would put an end to the usefulness of our present ports and harbours. Yet it is certain that changes more or less of this order of magnitude have occurred in Britain—submergence in the south, emergence in the north—during the period that is reckoned as geologically Recent, that is to say, the time later than the close of the Glacial period, and well within the range of Man's habitancy of this country. It speaks impressively for the difference between geological and practical standards of time-measurement, and for Man's confidence in his short historic experience, that this essential insecurity of our tenure in dock and harbour works has not yet intruded itself into the sphere of polity.

Returning to the main question, we have seen that in a well-settled country the water-flow, from the initial gutter to the final estuary, has been modified by man. It deserves further to be considered what effect the artificial regimen may have upon the normal processes of denudation. The waste of the land must still pass downward along the channels toward the sea, but we can be sure that the quantity, distribution, and rate of passage of the transported material will be modified by any change in the conditions of flow. Therefore, there must be considerable difference between the work of the controlled and of the uncontrolled stream; and if this difference be maintained for long, the result may in the aggregate be

* See, for example, the plans showing changes of the estuary of the Dee, compiled by Dr. A. Strahan, F.R.S., in "The Geology of . . . Flint, Mold and Ruthin," *Mem. Geol. Surv.*, 1890, plate II.; and of the Humber in *Mem. Geol. Surv.*, "The Geology of Holderness," etc., 1885 (folding plate), by C. Reid, F.R.S.

considerable. It is common knowledge that the run-off of the rainfall from a settled and cultivated country, except when artificially retained for irrigation or other purposes, is much more rapid than from wild lands; and this would imply more rapid corrosion of the channels were it not that the flow along them has been more or less effectively controlled. Under natural conditions the overloaded streams in flood choke their channels and spread constantly over the bordering flats, on which they often stagnate and deposit most of their suspended burden. But in a stabilized stream the muddy flood-water is pent and kept moving onward with little opportunity to clear itself; consequently there is a more rapid transmission of the finer waste to the sea or other basin of deposition, and presumably a heavier deposition of this material on the mud-flats in the tidal estuaries where the current is arrested.

Such is not the case, however, with the coarser material that is pushed or trundled along the bottom—the sand, gravel, and boulders—for this, when washed into the fairway, is no longer left to be dealt with casually by recurrent floods, but is artificially removed and usually placed beyond reach of further transport. The deposits that are cleared in this way from the channel are very generally used in raising the flood-banks, so that a large quantity of detritus that would under natural conditions be spread by the stream broadcast over its valley-floor is piled up close to the stabilized watercourse. Where this process has been long in operation, as in our own country, it is not unusual to find already a slight but well-defined rise of the ground in the immediate neighbourhood of the river on both sides; and in many cases the water-surface of the enclosed stream is constantly above the level of some of the flat land forming the alluvial floor of the valley. In such cases the condition is, of course, that of unstable equilibrium and would be soon upset if the control were relaxed.

The restriction of the area over which protected rivers can now deposit their load has to be borne in mind in estimating the antiquity of the alluvial sediments of the valley-floor. Setting aside the probability that during early prehistoric times there was a wetter climate than in modern times, we must recognize that if the streams, having their present volume only, were still in their original condition, they would be constantly making additions to their fluviatile deposits in places where all such accumulation has been in abeyance since the control was established. The depth at which early historic and pre-historic relics of man are found in alluvial beds on the river-flats may sometimes give rise to an exaggerated idea of the antiquity of the objects unless due allowance be made for this factor.

Without elaborating all the aspects of this wide subject, we may conclude that the general result of Man's interference with the streams is, that the natural deepening of the valleys is usually checked and in many places brought to a standstill, but that the degradation of the land-surface as a whole may be accelerated by the more rapid passage of the

finer waste to its bourne in lake or sea. The main tendency, therefore, will be toward a slow flattening of the contours of the land, with a gradual reduction in the relative value of its incised features.

It is to be noted that this also is the tendency of nearly all the other human operations affecting the surface. In agriculture, for example, there is a steady gravitation of the shifted soil to lower levels; so that in a ploughed field one looks always to the top of the slope in seeking information about the subsoil, which is generally there exposed in the furrow; and if there be transverse fences to arrest the regular downward movement of the soil-particles, it will often be found, in areas of old farm-land, that the ground level on the upward side of a fence is higher by some feet than on the downward side. In road and railway construction, again, and in the preparation of sites for building, there is almost always a directly conscious effort of the engineer to reduce a natural slope and to do so in such manner that gravity will aid the work. Even in quarrying of all kinds the higher sites are chosen wherever possible, so that while there is a local steepening of the gradient at the excavation, the excavated material is for the most part widely distributed at lower levels. It is in mining alone, of the great industries, and in a few other operations of subsidiary consequence, that Man's activities tend to build up the surface; and these exceptions, though locally conspicuous, are without general influence.

Granting that the various branches of human activity are, on the whole, cumulative toward the reduction of natural irregularities of the surface, it may still be held that the effect is, after all, in the aggregate trivial as compared with the effect of the uncontrolled natural processes. But I do not think that this is a sound comparison. Even in the oldest settled country, the period of Man's interference is so minutely fractional when compared with the period during which the main features of the present surface have been established, that we cannot arrive at a scale of proportional values for the controlled and uncontrolled processes. It is my impression from what I have seen in the field that, if the present type of civilization should last long enough to be measured geologically, the interference of Man with the natural conditions of drainage, along with his operations in other ways, will prove in all populous areas to be a factor of high consequence in smoothing the outlines of the lands of his habitation.

THE LAKE SYSTEM OF WESTRALIA.*

By Prof. J. W. GREGORY, F.R.S.

I. The Dry Lake Basins. II. Theories of their Origin: 1. As Wind-worn Plains; 2. As Glacial Rock Basins; 3. As Marine Remnants; 4. As Dismembered River Systems. III. The Chief Lake Groups: 1. The Raeside

* Map, p. 730.

Group; 2. The Cowan Group; 3. The Moore Group; 4. Other Lakes with Western Outlets. IV. The Age of the Lake System.

I. The Dry Lake Basins.

The most conspicuous feature on the map of central Westralia is the widespread system of great lakes. Some of them are more conspicuous on the map than they appear when standing on their shores; and it has been urged that "they are not lakes in any sense of the word, but a series of salt-clay pans." It has therefore been proposed that the lakes should be omitted from the maps, since "these lakes were invented by the early explorers, and have never since been altered upon the maps." If a lake is to be defined as a sheet of water surrounded by land, these certainly are rarely lakes. But as they are one of the most important and instructive features on the plains of Westralia, they certainly should be included on the maps, though it would be better if they were coloured yellow instead of blue, a course adopted in the 'Dead Heart of Australia.' Such illustrations as those of Lake Barlee, by Sir John Forrest (1875, opp. p. 33), and such photographs as those published by the Mines Department of Westralia of Lakes Violet, Way, Dundas, and Cowan,* show that many of these lakes occupy well-defined basins with a definite shore-line, and are certainly entitled to a place on the maps. Their usually waterless condition is well understood in Australia, where their title of lakes is too firmly established to be displaced. They are the Australian equivalents of the vleis of South Africa.

The number of these lakes is legion and their area often enormous. A recent enumeration of them by the West Australian Lands Department † includes 190, and the list is incomplete; and the areas given show that they range from a few acres up to over 900 square miles. Many of them are unnamed, and the two largest are known only by the term "Salt Lake," which is applied locally to many of them. They have been strangely neglected in the literature of Westralian geography, in spite of their many sources of interest. Even in the daytime these lake plains have an alluring attraction with their boundless wastes of brown mud, of sheets glistening like silver owing to their encrustation of salt or gypsum, and their yellow tracts of sand and lines of sandhills. During the low light of dawn and sunset, when the land is illuminated by the vivid colours due to the spectroscopic action of the dust-charged air, the lake plains give rise to the most picturesque effects in central Westralia.

The desire to explore these lakes is enhanced by the difficulty; they are often too soft and wet to be crossed on foot, and even when they contain

* Bulletin No. 34, 1908, pl. 2 and pl. 6; and No. 21, 1906, pls. 1 and 2.

† The list has been printed in the Commonwealth Official Year Book, No. 4, 1911, pp. 79-81, with the statement that "the schedule . . . gives the whole of the available information in regard to the lakes of this state;" the list would have been still more useful if it had given the altitudes.

water they are too shallow for the use of boats. On their greasy surfaces the camel is peculiarly helpless. They are sometimes traversed by caravans, and causeways for roads and railways have been built across them. As a rule, however, these wet lake-beds are absolutely impassable. They are utterly useless, and a frequent source of danger when the scent of their pools tempts camels and cattle to venture upon them, only to be embogged in their treacherous surface.

These dry lakes indicate that there has been a desiccation in western Australia; but in my recent paper, "Is the Earth Drying Up?"* I made no reference to their evidence, as it appeared best to consider them independently. Very little has been written about them, though there are frequent references to them in Australian literature. The valuable 'Western Australia Year Book' (13th edition, 1906, p. 97) dismisses them in the statement that "The so-called lakes in the interior of the state, which are frequently of very considerable area, are, except after the occasional heavy rains, merely immense salt marshes or clay pans."

The only paper that I know especially devoted to these lakes is an interesting discussion of their nature by Mr. H. P. Woodward (1897). He recognized two essential facts regarding them, viz. that they are connected into series by channels, and that they carry the drainage of central Westralia south-eastward. He pointed out that most of the water that falls on them is now lost by evaporation, and he attributed their origin to the wind.

II. Theories of their Origin.

Three explanations have been offered of the origin of this great lake system.

1. *As Wind-worn Plains.*—According to the first theory the basins are due to wind erosion. This theory has taken two forms. As represented by Mr. H. P. Woodward, the so-called lakes are areas where old rocks have been planed level by drifting sand. They are, he said, "salt wind-planed flats." He attributes them to wind, and not to water. Mr. Woodward points out that on some of these lakes the bed rock is buried beneath only a very thin sheet of drift, and is frequently exposed on the surface. Mr. Woodward lays stress on the thinness of the alluvial deposits as a difficulty in the lacustrine nature of the basins. In some of the lakes, however, the bed rocks are covered by alluvial material, hundreds of feet in thickness. Thus they have been proved by a bore to be 377 feet thick at Lake Cowan, and over 400 feet near Coolgardie; and the thickness of the alluvium at Lake Carey may be inferred from a remark by Jackson, (1905, p. 12). The plains of bare rock described by Mr. Woodward may represent shallow lake-beds from which the old alluvial deposits have been removed by the wind; or they may be areas which belong to a different category from the true lake-basins.

* *Geogr. Journ.*, vol. **43**, 1914, pp. 148–172, 293–318.

According to a modification of the wind erosion theory, the lake-basins are hollows which have been worn out by sand erosion. It is suggested that they were begun by "willy-willies" or wind eddies which swirl around quantities of sand, and must have a boring action on the ground beneath. But this theory fails to explain the distribution and variations in level of the lake-basins, and it assumed the shallowness of the alluvium on the lake floors.

2. *As Glacial Rock Basins.*—The discovery of the thick deposits in Lake Cowan led Mr. W. D. Campbell to advocate the glacial origin of these basins. The shore of Lake Cowan is at the level of about 880 feet above sea-level, and its old rock bed is less than 500 feet above sea-level. According to Mr. Campbell, it probably occupies a true rock basin. Mr. Campbell holds (p. 23) that "In regard to the origin of these rock basins there is but one agent that could scoop out hollows such as these, and that is ice, in either the form of an ice-cap over the whole country or by more local glaciers."

This possibility he supports by reference to the ice-grooved rock surfaces in South Australia, and of the Carboniferous glacial deposits in the Gascoyne valley in Westralia.

The South Australian glaciation was Cambrian; the most widespread glaciation in Australia was Carboniferous; and the only evidence for Pleistocene glaciation on the mainland of Australia is upon the summits of the highest peaks of the Southern Alps. There is no evidence of any Kainozoic glaciation in Westralia, and from the nature of the sediments in the lake-basins it would appear most improbable that these basins can date from any Palæozoic glaciation. The southern basins are certainly not pre-Kainozoic, and until some evidence of Kainozoic glacial action in this part of Australia be forthcoming the glacial theory may be dismissed.

3. *As Marine Remnants.*—A third explanation of these lakes was suggested to me by Mr. Montgomery, Government mining engineer of Westralia. He pointed to their widespread occurrence at the height of about 1200 feet above sea-level. He regards them as the remains of a former sea, and the beds of gravel which are occasionally found upon their shores as marine shingle. The sea in Kainozoic times reached a level in Westralia which renders Mr. Montgomery's suggestion possible; this fact is proved by the marine limestones at Norseman; but, as will be seen later, the varying level of the lakes and the absence of marine fossils north of Norseman render the marine theory improbable.*

4. *As Dismembered River Systems.*—The inadequacy of any one of these explanations was impressed on me during a visit to Westralia in 1909, and especially during a motor-ride from Leonora to Wiluna, the opportunity for which I owe to the kindness of the Hon. H. Gregory, the

* The sponge spicules from Princess Royal, on the eastern shore of Lake Cowan, described by Dr. Hinde (*Bull. Geol. Surv.*, W.A., No. 36, 1910, pp. 7-24, pl. I.-III.), yield no definite evidence as to age: they contain Cretaceous, Miocene, and living deep-sea species, and are as consistent with the Miocene as with the Pleistocene age of the deposit.

Minister of Mines for Westralia. I am also much indebted to Mr. Deeble for his skilful motorship during that tour and for the information which he gave me on the way. I had visited Lake Hannan, near Kalgoorlie, five years previously, and Mr. R. Hamilton kindly enabled me to see some of its neighbourhood in a drive from Boulder City.

The clue to the origin of these lake basins seems given by their altitudes. Neighbouring lakes occur at about the same level, but they have a gradual fall in one direction. Thus Lakes Violet and Way are close to the watershed between the Murchison basin and that of the main lake system. These two lakes occur at the level of a little over 2000 feet, and from them there is a long gradual slope south-eastward. The most numerous lake basins occur as wide depressions on a plain with a long gradual slope downward to the south-east.

One of the most important lessons to be learnt from these lakes is as to the former river systems of Westralia, for it appears possible to recognize from them the courses of the rivers in a period when Westralia was under very different geographical conditions from those of the present time.

That the lakes are remnants of dismembered river systems is indicated both by their distribution and shapes. They occur in connected groups, and are usually very narrow in proportion to their length. Thus Lake Raeside is represented as having a length of about 133 miles by a width of 2 miles. Lake Moore consists of one long channel with four similar tributaries. Lake Wells is represented as crescentic, and its form resembles a great river meander. The grouping of the lakes suggests that they occupy the expansions of old river valleys, most of which have been buried by alluvial deposits. The deeper parts of the basins have been probably filled by lake silts, and during a period of desiccation wind-transported drifts formed banks across the narrower parts of the valleys and thus divided a once continuous river-basin into a series of basins of internal drainage.

Owing to the almost complete burial of the country by sub-aerial deposits, the lake deposits are seldom exposed to view. Mr. Montgomery directed my attention to a beach on a lake south of Wiluna ; but it appeared to me to resemble rather a stony bank beside a sluggish river or quiet lake-shore than a bed of marine shingle. I could find on it no pebble having the form characteristic of those of sea-beaches.

Various mining operations have proved in the alluvial deposits the existence of gravels which appear to have the character of river gravels ; but it is of course possible that these beds might have been formed by rivers near their entrance to a sea. Such evidence as is available as to the nature of the deposits in and beside these lakes appears to me, however, in favour of their lacustrine and fluviatile rather than of their marine origin.

The most weighty arguments for the fluviatile origin of these lakes is their distribution and range in altitude. The altitude of many of these lakes is uncertain ; but the railway levels, on which absolute reliance may be placed, fix the height of a sufficient number of the lakes to leave no

doubt of the relations of the main series. On the accompanying map are inserted heights collected by many observers, and these figures naturally require some modification. Thus, from Lake Cowan north-eastward to the frontier of South Australia is a valuable series of altitudes determined by Lindsay (1893); and his heights appear to me to be generally about 200 feet too low; but even such an amount does not seriously affect the general slope. For a line from Leonora to the Murchison watershed near Wiluna I have trusted to a series of aneroid readings made during my visit there in 1909; and the aneroid levels taken on the outward and return journeys agree so closely that they are probably approximately and are certainly sufficiently accurate.

III. The Chief Lake Groups.

1. *The Raeside Group.*—Accepting the fluviatile origin of the rocks and the available altitudes, the lake basins of Westralia may be divided into four main groups. The most important series includes Lake Violet on the north, Lake Wells on the north-east, and Lake Barlee on the west. Lake Violet, according to my aneroid determinations, is at about the height of 2050, and Lake Way to the south of it is probably a little over 2000 feet.* Further south, near Sir Samuel, is Lake Miranda at the height of 1850 feet. The lake south-east of Lawlers must be at the height of about 1400 feet, as Poison creek, which leads to it, is crossed at the level of 1450 feet. The next lake on the series is the long narrow channel of Lake Raeside. Doyle's Well, a little to the north of its western end, is at 1250 feet, while the lake itself must be a little below 1200 feet; for, according to the railway levels, Leonora to the north of the lake is at 1231 feet, and the railway crosses Lake Raeside near Tampa at the level of about 1190 feet or perhaps a little lower. Lake Raeside is the main channel which discharged the drainage from the Lake Way district; it received tributaries from Lake Barlee on the west and from Lake Darlot and Lake Wells on the north-east. According to Lindsay, Lake Wells is at 1550 feet, and his heights are often 200 feet or so too low. Lake Carey is probably at about 1300 feet, as the railway level to the north of it, east of Morgans, is at 1352 feet. Both Lakes Wells and Carey would have discharged into the main river channel below Lake Raeside.

As Lake Raeside was the main channel of this central group of lakes they may be conveniently grouped together as the Raeside series, and attributed to an ancient Raeside river. For the outlet of this river there are alternative positions. As the level of Lake Raeside is below 1200 it cannot have discharged due southward past Kalgoorlie; but it is tempting to regard it as having continued through the lakes near Kurnalpi and discharged to the Southern ocean at Esperance bay,† after passing through

* Lindsay assigns Lake Way the height of 1750 feet: according to Mr. Greenard, of Menzies, it is 1900 feet.

† C. R. Gibson (1906, p. 11) has remarked that it discharges the drainage from the southern part of the Mount Margaret goldfield.

Lakes Lefroy, Cowan and Dundas. As Lake Cowan is at the height of 885 feet and Lake Dundas at 865 feet, there would be an adequate fall between them and Lake Raeside.

According to Lindsay (1893, p. 7, and maps) there is, however, to the east of the southern end of Lake Raeside and to the north-east of Queen Victoria spring, an area which is only 700 feet above sea-level. This depression is around 30° S. and 124° E., and as the Eucla limestones extend inland to the height of about 1000 feet, the sea probably covered this part of Australia and extended north-west of Queen Victoria spring.* If the Raeside river dates from this period it would have entered the sea through this bay, and could not have reached Lake Cowan.

2. *The Cowan Group.*—The series of lakes, then, from Coolgardie southward to Lake Dundas would have belonged to an independent river which would have had its mouth at Norseman when the sea extended inland to that locality, and somewhere between Lake Dundas and Esperance bay during the re-emergence of the land.

3. *Lake Moore Group.*—Lake Moore (1100 feet) is separated from Lake Barlee by a watershed which rises to the height of 1600 and 1700 feet, and was probably the original western watershed of the Raeside basin. Lake Moore would have discharged to the sea along the western coast and the south-west trend of both it and Lake Monger suggest that their outlet was through the Moore river.

4. *Other Lakes with Western Outlets.*—Lake Austin (1364 feet) would find its natural outlet down the Sanford river to the Murchison; the numerous smaller lakes in the area between Lake Moore and Coolgardie may have joined the river from that lake; but they more probably had an independent outlet to the sea through the Swan river. The group of lakes of which Lake Nabberoo is the longest channel, may have discharged westward through Lake Gregory (named by Hann after the Hon. H. Gregory) to the Murchison river or passed to the north of the Peak to the Gascoyne river, though their discharge eastward to Lake Carnegie is also possible, owing to the uncertainty of the heights in this district.

IV. The Age of the Lake System.

The existence of this river system and of many extensive lakes indicates that at one time western Australia was much better watered than it is at present; and it may therefore appear to indicate a recent great desiccation of the country. This better watered condition appears, however, to date from a very remote period. The most direct evidence as to its age is given by the marine limestones discovered by Mr. W. D. Campbell on the shore of Lake Cowan near Norseman. These have been described in Mr. Campbell's valuable memoir on the Norseman district. The fossils appear

* A gulf going northward from the Kainozoic sea in this district is shown in Gibb Maitland's map (1908, Plate I.).

poorly preserved, and he says they include recent marine shells, such as Turritella, Pecten, Cardium or Cardita, with echinoids, bryozoa, and Magellania. He accepts the age of these limestones as either late Tertiary or Recent; but he also points out that these marine deposits were formed when southern Westralia stood 900 feet lower than it does now.

Mr. Gibb Maitland, in his Presidential Address to the geological section of the Australian Association at Adelaide, also accepts the limestones as "late Tertiary or Recent." Nevertheless the genera recorded suggest whether these Bryozoal limestones may not be of the same age as those of the marine limestone series which is so well known along the southern coast of Australia; and the age of the main deposits in this series Mr. Chapman (1914) has identified as Miocene. Until some of the fossils are specifically identified the age of Norseman limestones remains uncertain; but the genera mentioned are as consistent with a Miocene as with a Pleistocene age. There is no evidence of a Pleistocene transgression of the sea in southern Australia to the height of 900 feet. Until specifically determinable fossils from the Norseman limestones are forthcoming, the physiographic evidence as to their age appears the more reliable, and according to it, the beds are probably Miocene.

The river system may have been coeval with the deposition of the Norseman limestone; and the gradual nature of the slope, especially about the level of 1000 feet above the sea, indicates that the valleys were excavated when the base level of the country was approximately at the level of the Norseman limestone.

If the deep depression of Lake Cowan were cut out by river erosion it would probably have been excavated a little later than the Norseman limestone, while the valleys further inland were probably begun somewhat earlier, as otherwise the lake basin would have contained marine limestones. But if the basin were due to the warping of a valley during the earth movements which upraised the country, the valley would have been excavated not later than the Miocene.

The Norseman limestone shows that during its formation, *i.e.* probably in Miocene times, the level of the land was nine hundred feet lower than it is now; and, as western Australia was then reduced to a base-level peneplane, Lake Way would have been only 1000 feet above the sea, which would have extended far into the interior. Under the geographical conditions then prevalent, Westralia would have had a moister climate than it has now, as even if the total rainfall had been the same, it would have been more uniformly spread, as there would have been no sudden uplift of the air on to the high plateau with the consequent precipitation of most of the moisture as coastal rain.

The dry lakes of Westralia are therefore depressions in a river system which was probably Miocene in origin; these rivers were broken up by their inability to keep their channels clear from encroaching sand-dunes during the post-Miocene desiccation, which may be explained by a reduction

of internal rainfall coincident with the uplift of the country for about 1000 feet.

REFERENCES.

CAMPBELL, W. D. 1906. "The Geology and Mineral Resources of the Norseman District, Dundas Goldfield," *Geol. Surv. West. Aust.*, Bull. 21, 140 pp., 1 map (in 2 sheets), 5 pl.

CHAPMAN, F. 1914. "Australasian Fossils. A Student's Manual of Palæontology,' 341 pp., map.

1911. 'Official Year Book of the Commonwealth of Australia,' No. 4, 1230 pp.

FORREST, JOHN. 1875. 'Explorations in Australia,' viii., 354 pp., 4 maps.

GIBSON, C. G. 1906. "The Laverton, Burtville, and Erlistoun Auriferous Belt, Mount Margaret Goldfield," *Geol. Surv. West. Aust.*, Bull. 24, vi, 79 pp., 13 maps, 26 pls.

GIBSON, C. G. 1908. "Report upon the Auriferous Deposits of Barrambie and Errolls (Cue District and Gum Creek (Nannine District) in the Murchison Goldfield; also Wiluna (Lawlers District) in the East Murchison Goldfield," *Geol. Surv. West. Aust.*, Bull. 34, 44 pp., 2 maps, 3 pls., 6 photographs.

JACKSON, C. F. V. 1905. I. "Geological Features and Auriferous Deposits of Mount Morgans (Mount Margaret Goldfield);" also II. "Notes on the Geology and Ore Deposits of Mulgabbie (North Coolgardie Goldfield)," *Geol. Surv. West. Aust.*, Bull. 18, 36 pp., 2 maps, 1 sheet of sections.

LINDSAY, D. 1893. 'Journal of the Elder Scientific Exploring Expedition, 1891–2. Under Command of D. Lindsay.' Adelaide, 207 pp., 2 maps.

MAITLAND, A. GIBB. 1908. "Recent Advances in the Knowledge of the Geology of West Australia," *Rep. Aust. Assoc. Adv. Sci.*, Vol. **11**, pp. 131–157, pl. 1, 1906. 'Western Australian Year-Book for 1902–04' (thirteenth edition), x, 1283 pp., 73 illustrations, 16 maps and diagrams.

WOODWARD, H. P. 1897. "The Dry Lakes of Western Australia," *Geol. Mag.*, Dec. 4, vol. **4**, pp. 363–366.

WOODWARD, H. P. 1906. "The Auriferous Deposits and Mines of Menzies, North Coolgardie Goldfield," *Geol. Surv. West. Aust.*, Bull. 22, 92 pp., 2 maps, 6 pls.

THE INDO-RUSSIAN TRIANGULATION CONNECTION.

By Lieut. **KENNETH MASON**, R.E.

DURING the International Geodetic Conference of 1909, which met in London, the question of a triangulation connection between India and Russia was discussed, and it was suggested that a link might be effected across the northern boundary ranges of India to the Chinese or Russian Pamirs, and in the early part of the year 1911, the Surveyor-General of India received a request for the Indian triangulation to be carried on to the northern frontier.

By this time, the Russian work, which had been initiated by Colonel Tcheikine from the base Ourtak-Tchoucour-Machali-Goudour, latitude 39° 33′, approximately, on the Trans-Alai mountains, had reached the neighbourhood of Pamirski post, about lat. 38° 13′, long. 75°.

An Indian Principal Series, started from near Rawal-Pindi in 1909, from the base Nerh-Khagriana, of the North-West Himalaya series, by Mr. J. de Graaff Hunter, had been taken to the neighbourhood of Shardi by the end of 1910, and forward stations were reconnoitred up to the neighbourhood of Gilgit. It had been decided to take this series as far north as this, independently of the idea of making a connection with the Russian work.

During 1911, the late Lieut. H. G. Bell, R.E., who succeeded Mr. Hunter in charge of the detachment, carried this principal series up to Gilgit. Many difficulties were encountered owing to the necessity of an early start; snow lay as low as 8000 feet, and great difficulty was experienced in placing the lamp squads on the hills for the observations from the first station. A bad spell of weather set in when Lieut. Bell was on Liowi H.S., 17,480 feet, and he was detained there from June 13 till June 21, with a minimum temperature of 20° F.

Again, on Zinghi Shish, the detachment met with very bad weather, and the portable lightning conductor, which had been erected over the observatory tent, was struck.

While on the march up the Indus valley, a severe earthquake shock was experienced which caused a cliff to be precipitated into the river. The heat here was so intense that marching could only be undertaken during the early morning and late evening, which offered a marked contrast to the high camps situated on snow.

With a view to reconnoitring a feasible line for effecting a junction with the Russian system, Lieut. Bell and Mr. Wainwright left Gilgit on August 1, the former taking the Darkot route, while the latter reconnoitred up the Hunza valley. Lieut. Bell first visited the Darkot pass, by way of the Yasin valley, examining the peaks in the vicinity, in the hope of finding some possible connection on to the Salisbury and Concord peaks on the Russo-Afghan frontier. He found the extensive glacier, rising on the pass, much intersected by crevasses, and only passable in the very early morning. The highest peak, about 19,370 feet, west of the pass, was found to be quite inaccessible for triangulation purposes, and the neighbouring peaks, though lower, were useless, owing to the high unclimbable peaks to the south and south-east. From Darkot, Lieut. Bell visited the approaches of Garmush, 20,564 feet, but found that the glaciers in the neighbourhood were extremely dangerous, and the slopes very subject to avalanches. The Darkot-Askuman pass was crossed, and a peak ascended with a view to obtaining a more extensive reconnaissance of Garmush and the other peaks of the Sakiz-Jarab range, but the term "glorified Matterhorns" which has been applied to the Karakoram peaks further east, was found to be equally applicable here. In a letter written from hereabouts to me, Lieut. Bell mentioned that he doubted whether the peaks would be accessible for an experienced party of climbers, and that it was a physical impossibility to take an instrument up any one

of them. A move was now made up the Karumbar valley, in the hope of finding a possible line of connection to the Russian stations from here. The lower reaches gave hopes of success, but from Imit northwards the valley closes in, and the mountains rise precipitously from the banks of the river-bed. Progress was slow up the western bank, and the route was further barred by a landslip, which night and day discharged rocks and earth into the river. Further advance became impossible when the Karumbar flooded, for this river, like all others of any size in the Hindu Kush and Western Karakoram, rises to such a size that the fords upon which the route depends become impassable in the summer. The possibility of utilizing this route was, however, never abandoned by Lieut. Bell, should the Hunza valley route fail to yield better prospects of success.

Mr. Wainwright meanwhile made a reconnaissance towards the Kilik pass, and reported that it would be practicable to run a series as far as Misgar, but that it would be advisable from here to branch off up the Khunjerab valley, and effect a link by means of the Kharchanai pass. Owing to the rough track, he advised the use of a smaller instrument than the 12-inch theodolite.

During the summer of 1911, the Russian triangulation had been extended to the Russian frontier, and two stations—Beyik, approximate lat. 37° 18′, approximate long. 75° 7′, and Taghramansu, approximate lat. 37° 16′, approximate long. 74° 54′—had been fixed. Owing to the results of Lieut. Bell's reconnaissance, however, since the peaks of the Sakiz Jarab were unsuitable, this method of connection had to be abandoned, and it was decided to make the attempt *viâ* the Mintaka, Kharchanai, or Kilik passes.

Lieut. Bell was again in charge of the detachment during the summer of 1912, and arrived in Gilgit by May 31. It had been decided to base the connection on a side of the Kashmir Principal Series, in lat. 35° 55′ and long. 74° 20′, from which it would trend northwards to near Chalt, and thence, following the bends of the Hunza river, it would more or less keep to this valley till the passes were reached. From there it was intended to take the series to the Russian stations, Kukhtek and Sarblock, on either side of the Beyik pass, in about lat. 37° 20′ and long. 75° 10′. Lieut. Bell decided to go straight through to the Russian end and work back, while a second squad under Mr. Collins worked up from the neighbourhood of Gilgit.

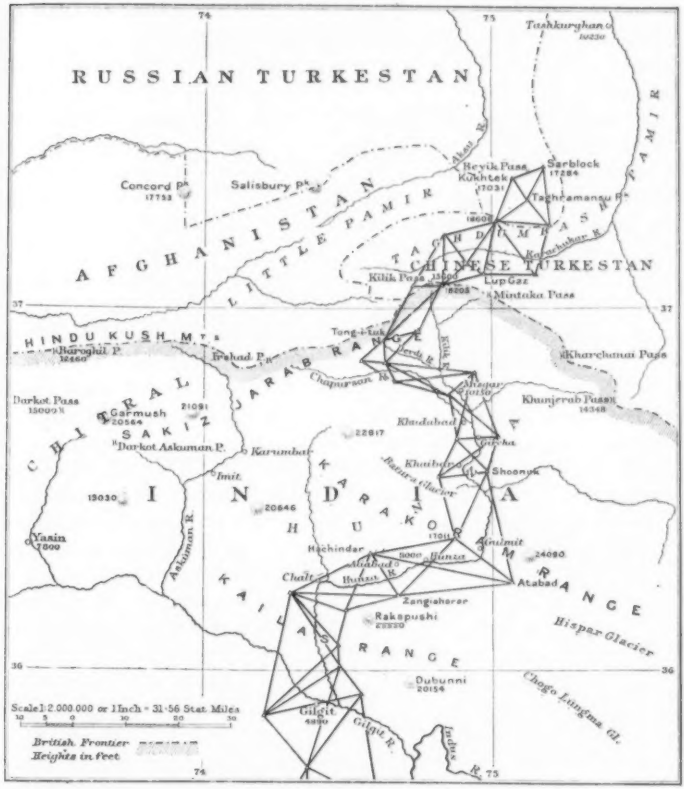
The year was a disastrous one for the Survey. Early in June the various detachments left Gilgit, but the weather was very unfavourable, and while on Yashochish hill station, on the Great Himalayan range, the camp of Mr. Abdul Hai was wrecked by lightning; his servant was killed and his recorder was severely burnt, while he himself received a bad shock which necessitated his return to Gilgit. This district is notoriously bad for electrical disturbances, and very different from the regions of the Karakoram, which, as has been observed by the Duke of the Abruzzi, are

very free from storms. Mr. Collins now carried on the triangulation from Gilgit towards Hunza, when, on July 28, he had to take over charge of the detachment owing to Lieut. Bell's death.

The latter, with Mr. McInnes, had travelled *viâ* the Hunza gorge to the Pamirs, crossing by the Mintaka pass to the Taghdumbash. After detailing Mr. McInnes for the work of reconnaissance towards the Kilik

THE INDO-RUSSIAN TRIANGULATION CONNECTION.

To illustrate the paper by Lieut. Kenneth Mason, R.E.



pass, Lieut. Bell proceeded to the Russian stations on either side of the Beyik pass on the Russo-Chinese frontier, and met the Russian triangulation party under Colonel Tcheikine on the pass. He completed three stations, and ascended a fourth, but found some difficulty in observing from it to Lup Gaz. He therefore moved his camp back to the latter station with a view to finding out whether the ray was visible. He had not

been very fit for the last few days, and had been over-exerting himself. On July 19, when at his camp on Lup Gaz hill station, he awoke in very great pain, and finding that he became no better, he had himself carried down to his base camp in the Lup Gaz Jilga. He remained here for a few days, and on the morning of the 24th, sent a note to Mr. McInnes asking him to come and take over the observations. Mr. McInnes received this when in camp near the Kilik pass on the following morning, and immediately left for Lup Gaz, traversing the Pamir from the Kilik to Lieut. Bell's camp, a distance of nearly 40 miles, the same day; he arrived in the evening to find Lieut. Bell very weak. The latter refused to allow Mr. McInnes to sit up with him, urging that he must be very tired, and should go and lie down and rest after his long ride. It was characteristic of him absolutely. He knew the gravity of his case, for he went into a few details of the work, and asked Mr. McInnes to go up the station the next day, and get through as much of the work as he could, but he tried to look on his illness as cheerily as he could, saying that he hoped soon to be fit enough to carry on again. He assured Mr. McInnes that he would call him if he wanted anything during the night, but about midnight he passed away alone. It is hardly necessary to add after what has been said, that the ultimate success of the work was due almost entirely to the energy and devotion of Lieut. Bell. During his short stay on the Pamirs, he had earned a reputation for unselfishness and self-sacrifice, and I found this year that he had been held in very high esteem. On his death I personally lost my dearest friend, and I had known him intimately for many years; he was a daring mountaineer, and absolutely fearless, and his loss to the Service and to Geography is incalculable.

This disaster delayed the work very largely, and by the end of the season, a late one as Pamir summers go, the triangulation had only been completed from the Gilgit side to a point some little way below Hunza. Mr. McInnes finished the reconnaissance of the Pamir section, but the work done in the Hunza gorge showed that a departure would have to be made below Misgar, in order to obtain suitable figures. As the crow flies, there remained about 70 to 80 miles to be traversed by the triangulation, but the actual length of the chain was nearer 120 miles. Of this, some 75 miles had been reconnoitred and the stations built, and with the exception of the two stations near the Kilik pass these were subsequently found suitable.

During the early part of 1913, I was given charge of the detachment to complete the connection. All through the season we were luckier than last year; and, owing to an earlier start and fine weather on the passes, we reached Gilgit a fortnight earlier. The detachment, which had marched up in three separate squads in order to facilitate transport, concentrated at Aliabad, Hunza, on May 20, after leaving a main depôt at Gilgit. The distribution of the work was arranged in a somewhat similar manner to last year's scheme. Mr. Collins was to work up the Hunza river, Mr.

FIG. 1.—RAKAPUSHI FROM NEAR TASHOT, HUNZA OR DUMANI.

FIG. 2.—PASU AND THE HUNZA GORGE, WITH MOUNTAINS OF SHOONUK.

FIG 3.—VIEW SOUTH FROM KILIK WEST H.S., SHOWING ON THE RIGHT THE MOUNTAINS OVER WHICH THE TRIANGULATION WAS CARRIED. THE V DEPRESSION ON THE LEFT IS THE HUNZA GORGE AT MURKUSHI.

FIG. 4.—KILIP EAST H.S. (ABOUT 19,000 FEET).

McInnes to reconnoitre in the country between Khudabad and the Kilik, while my detachment proceeded straight to the Pamirs, to the point where Lieut. Bell had left off. Captain R. W. G. Hingston, I.M.S., who had been attached to the party, accompanied the latter detachment, with a view to studying the natural history of the district, and rendering any medical assistance that might be required.

Mr. Collins' detachment commenced work about the end of May, visiting his two last stations of 1912, Zangiaharar and Hachindar, the former on the northern slopes of Rakaposhi, the latter on the hills above the right bank of the Hunza river (Fig. 1). Helio squads were placed there, and Mr. Collins then proceeded up the Hunza valley. He found that his next station, Atabad, on a spur of the mountain for which Sir Martin Conway obtained the formidable name, Mount Boiohaghurdooanasur—which means in the Burishushki * language, "Where only the horse of a demon can go"—too difficult to climb at this early season. So he decided to continue up the valley, and return at a later season. Between Atabad and Gulmit, the valley narrows to a precipitous gorge, where the Hunza cuts its way through the main axis of the Karakoram, and the summer road, carried high up across the face of a cliff, a thousand feet or so above the river, is only laid on pegs driven into the rock, and is distinctly sensational. Mr. Collins' next stations were on either side of the river just south of the village of Khaibar, that on the left bank, being on the rocky peaks of Shoonuk (Fig. 2), while the other was on the northern boundary wall of the long Batura glacier. This detachment completed the triangulation up to the junction of the Chapursan and the Kilik rivers, including four more stations besides those already mentioned, namely, Kirilgoz and Sirsar on either side of the river at Gircha, and Tehri Sar and Raminj Sar at the mouth of the Chapursan valley. It then marched down the Hunza and completed the observations at Booriharar and Atabad, making a total of eight stations, of which the average height was 15,090 feet.

Mr. McInnes' detachment marched direct to the Chapursan and rapidly selected the stations up this valley. Like the majority of the longitudinal valleys of the mountain barrier, the valley is not very precipitous, particularly in its lower reaches. The difficulty arose when the question of connecting on the work from here to the Pamirs came to be settled, and Mr. McInnes climbed a large number of hills before he succeeded in even finding one that would range through to the north, and this necessitated a change of two stations near the Kilik pass. After first reconnoitring Hark mountain † from the south, he brought his detachment to Bun-i-kotal, south of the pass, and we discussed the possibility of

* Or Burishaski. See 'Tribes of the Hindu Kush,' Biddulph.

† Hark mountain, or Tong-i-tuk, is situated on the watershed between the Derdi valley and the Hark, which is the last and most northerly tributary of the Kilik river from the west, and joins this river at Bun-i-kotal.

effecting a link across these mountains.* Hark mountain, 19,135 feet, is extremely difficult to climb from the north, and Mr. McInnes, who decided to tackle it from the south, and left us at the pass on July 2, did not succeed in getting his instruments up until the 22nd; this mountain is called Tong-i-tuk from the south.

After making a station on Tong-i-tuk, Mr. McInnes again had difficulty in finding another hill from which he could join on to this station and the Kiliks, and the final connection was not completed, owing to unfavourable weather, until August 25. Mr. McInnes observed from five stations, of which the average height was 17,616 feet.

The Pamir detachment, which came with me, left Hunza on May 23, and after marching up the Hunza valley, reached the Taghdumbash Pamir *viâ* the Mintaka pass, on June 3. Reconnaissance was carried out to ascertain that Lieut. Bell's stations had not been lost during the winter, the signallers were placed on their posts, and we marched to the Russian station of Sarblock. A bad spell of weather set in which lasted a week or so, and delayed the observations, so that only three stations were completed by the end of the month. Early in July, after meeting Mr. McInnes at the Kilik pass to arrange with him the details of the link, the party was again held up for some days and nights on Kilik east hill station, 18,203 feet,† and was hardly able to leave the Whymper tents (Fig. 4 shows the observatory tent on this station). When the weather again cleared, the work was hurried on, but was delayed somewhat by a signaller and his mate going sick and being unable to show a helio. The recorder met with an accident, but Captain Hingston very kindly undertook his duties in addition to his own. In spite of these troubles, however, by the end of July, the triangulation had been carried to the Kilik pass from the Russian end, and on August 5, was completed at Mr. McInnes' southern stations, making a total of ten stations, averaging 17,716 feet.

The weather in these parts is very unfavourable to triangulation. Nearly half the days had seen snow falling, but on many of them work was possible at some time or other. Owing to the strain on the eyes of observing on hills covered with a mantle of snow, I suffered from an attack of snow-blindness, and, after this, frequent rests were essential on the hill stations, and work in camp of an evening became troublesome. One of the greatest difficulties, however, was the rationing of the detachments, which in the case of the Pamir section numbered over 100 men. The Pamirs produce nothing but milk, sheep, and goats, and the latter were ruinously expensive. We bought for this detachment alone, 200 maunds (16,000 lbs.) of ata (flour) before leaving Hunza, but some of this was to be sent up later; the Hunza authorities delayed the despatch of this convoy, and it eventually arrived within reach of two days' march, three weeks late, when the detachment had been on half rations for some days.

* Fig. 3 shows this country as seen from Kilik West H.S.

† Aneroid height, 19,300 feet; 1100 feet too high.

and had only four days' half rations left. Luckily the detachment did not realize that the depôt camp was empty. Again, towards the end of the season, owing to a promise from the Amban of Tashkurghan, on which we had been counting, and which he was unable to fulfil owing to the arrival of Chinese troops, we were again thrown on half rations for a fortnight, and eventually left with only four days' half rations.

On August 25, Mr. McInnes connected through to the two Kilik stations from the Indian series, and the connection between India and Russia was at last complete.

The chain connecting the Russian stations with those of the Indian Principal Triangulation near Gilgit, consists, as may be seen on the sketch-map (p. 667), of seven quadrilateral figures in which the diagonals were uninterrupted rays, two other four-sided figures in which a central station had to be inserted, and eleven single triangles. The number of stations, including those from which it emanates and those on which it closes, is thirty-three. The average height of the stations is 16,222 feet. The highest is Tong-i-tuk, 19,135 feet. This station was climbed by Mr. McInnes.

The average length of the sides of the triangles is 8637 miles, and the co-ordinates of the Russian stations as computed from the Indian side are—

	Height. Feet.
Russian west, lat. 37° 17′ 32″·97, long. 75° 00′ 12″·19	17,031
Russian east, lat. 37° 18′ 58″·92, long. 75° 04′ 41″·17	17,284

Besides the work of triangulation, Captain Hingston and I took a series of photographs on the extended stereoscopic base system, for the subsequent compilation of a map by stereo-photography, by the method devised by Captain Vivian Thompson, R.E. This cannot hope to be an absolutely complete map, as the topography had to be treated as of very secondary importance, and no reconnaissance was possible, but it is to be hoped that in addition to an accurate map of those parts photographed, much light will be thrown on the question of the easterly extension of the Northern Hindu Kush range. I do not believe that the Sarikol range extends south of the main Karachukar river, nor does it connect on with the Aghil range at all, and this range is possibly an extension of the northern Hindu Kush and old northern Karakoram ranges, the latter range having now been cut so much into granite blocks and isolated massifs by the headwaters of the Hunza river, that it has lost all appearance of a present-day range. Some observations were made of geological interest, and rock specimens were brought back from both Hunza and from the Pamirs by the detachment. These have since been classified by Mr. J. Coggin Brown, of the Geological Survey of India.

A Botanical collection was also made of all plants met with, but these comprised only 48 species, the Pamirs not being at all rich in flora. The collection is now being classified at the Royal Botanic Gardens, Sibpur,

Calcutta. It seems probable that two or three of the plants collected are of new species.

Captain Hingston also made a very complete zoological collection of the fauna of the Taghdumbash and of the district included by the road between here and Bandipur, which he is now working out, and in addition made a series of hæmatological observations at various altitudes ranging up to about 18,500 feet, which seem to throw some light on mountain distress. As regards the latter, the whole detachment was remarkably free from any ill effects from altitude, though loss of appetite was experienced after remaining at an average height of approximately 15,000 feet for two months with constant work on hand.

In addition to these results, Captain Hingston took a series of observations to cirrus clouds for the Meteorological Survey of India, as often as they were visible.

In conclusion, I have to record my deep indebtedness to the Hon. Mr. Stuart Fraser, Resident in Kashmir, to Major A. D. Macpherson, Political Agent at Gilgit, and to Sir George Macartney, His Britannic Majesty's Consul-General at Kashgar, without whose extreme kindness and sympathy, the work could never have been carried out; to Mr. H. H. Hayden, Director of the Geological Survey of India, and to Dr. Gilbert Walker, Director-General of Observatories, for their assistance and kindness; and lastly to my fellow-workers and faithful coolies, who never failed to lighten the work to the best of their power.

DR. F. DE FILIPPI'S ASIATIC EXPEDITION.

Dr. F. de Filippi sends from Leh, Ladakh, the following account of the scientific work from November 5, 1913, to March 31, 1914 :—

A plan to make a gravimetrical station to the south of Skardu, on the range which girds from this side the Deosai plateau, was mentioned in the former report (*Geographical Journal*, January, 1914, p. 32). This was successfully carried out between November 6 and 17. The station was made at Wozel Hadur, a narrow terrace in the vale of Burgi La, at an altitude of 14,042 feet, beyond which it would have been impossible to pitch the tents, owing to the steepness of the ground and to the deep snow.

The pendulum observations were made in a large tent with three walls, which had been especially devised, and which answered the purpose very well. These were followed by the magnetic observations, and regular readings were taken of barometers and hypsometers, pilot-balloons were sent up, and determinations of the intensity of solar radiation were made with Ångström's and Abbot's pyrheliometers. In addition to the photographic work for topographical purposes, Lieut. Antilli took telephotographic panoramic views (on November 8 and 12) of the Karakoram ranges from a peak to the east of Burgi La, at an altitude of 16,600 feet.

Soon after their return to Skardu, Commander Alessio and Prof. Abetti established the local gravity station. Then followed a period of twelve days of wireless transmissions of time-signals from Lahore, which were received and registered simultaneously at Dehra Dun and at Skardu.* Star observations for the determination of time were taken before and after the transmission of signals.

The results of this first series of experiments, while good enough to allow a sufficiently correct determination of difference of longitude between Dehra Dun and Skardu, showed certain irregularities in the perception of signals, which appeared to be worthy of further investigation. These irregularities might be attributed to the type of receiver employed (carborundum crystals), or to special and varying conditions of the atmosphere in the regions traversed by the Hertzian wave, or to both these causes. The present expedition offers very exceptional opportunities for this research, because of the great variety of places, of distances, of topographical conditions, and of seasons in which it is bound to find itself in the course of time.

Therefore the observers have submitted to the competent departments of the Government of India a programme of extensive experiments to be made at different times and stations. It is hoped that these experiments, besides being fundamental in determining the differences of longitude between the said stations and Dehra Dun, may lead to some conclusions regarding the conditions which influence the wireless transmissions across vast mountainous regions. At the same time, in order to study the question from every point of view, a request was addressed to the Royal Hydrographical Institute of Genoa for Ducretet's electrolytical receiver. The latter has lately arrived to Leh, and the wireless station of Lahore has been instructed by the Department of posts and telegraphs to execute the whole programme of transmissions proposed, while the trigonometrical survey at Dehra Dun, with the usual favour shown on every occasion to the work of the expedition, has appointed some of its officers to cooperate in these researches.

The last weeks of 1913 were taken up with the astronomical observations for latitude and with the measure of a base line. The expedition is supplied with four invar wires for the measurement of the base lines.

During January, 1914, Alessio and Abetti were engaged in topographical work and in the determination of the daily magnetic variation. These were preceded and followed by observations on the absolute magnetic elements.

Meteorological records were regularly taken in Skardu by Marchese Ginori three times a day. Winter in Skardu has been on the whole less

* In the former report mention was made of the preliminary experiments carried on in this field during the month of October, 1913.

severe than might have been expected. Towards the end of December there was a short period of cold days when the thermometer registered + 1·9° Fahr. In January the temperature only fell to + 8·6° Fahr. The air was always absolutely still; snow fell at short intervals, but always in small quantity. The sky, especially in January, was mostly overcast, and the mountain crests were covered with mist and clouds, which considerably hampered the topographical work and the pilot balloon observations, as well as the determinations of solar radiation (pyrheliometers of Ångström, of Abbot and of Amerio).

The mild winter, the small amount of snow, and the absence of storms allowed Prof. Dainelli to make extensive geological excursions. During November he explored the basin of Skardu; in December he went up the Shigar valley and its two main branches, the Braldoh and the Basha valleys, and inspected the terminal portions of the Biafo, the Baltoro and the Chogo Lungma glaciers. Finally, in January, he went up the Shyok valley from its termination in the Indus valley to Biandong (Ladakh), and on his way back ascended the Saltoro and the Nubra valleys up to the glaciers. These explorations, and those made later on in Ladakh, will lead to a general discussion and to the modification of some of the prevailing theories about the geology of this district. Prof. Dainelli has also conducted systematic observations of the people, which will serve for an anthropogeographical study of the country, and to fix the character and the habits of the various ethnical types which it contains.

Among other things, these excursions of Dainelli proved how easy it is to travel in these valleys during winter, and encouraged the expedition to make an early start from Skardu. One more series of wireless time-signal transmissions was made between February 2 and 14, and immediately after, on the 16th, the expedition left Skardu, and, retracing its steps up the Indus valley, arrived on the 22nd at Kargil, situated in the Suru valley, 8790 feet above sea-level.

Four stages above Skardu, at Kharmang, the Indus was entirely frozen, and the ice was thick enough to allow horses and men to cross. These natural bridges occur more and more frequently higher up, and they make easy communications between villages of the opposite banks which are entirely isolated in every other season. Dainelli took advantage of this facility to explore a portion of the Indus valley between the confluence of the Suru-Dras and the confluence of the Hanu, which has been rarely, if ever, visited by travellers. This gave him a chance of collecting anthropological and social data of certain groups of Dard people which have here preserved unmixed their ethnical characters. These studies are now being extended to the Ladakhi people.

A halt of ten days was made at Kargil for the usual observations in gravity, magnetism, meteorology and aerology, and for another series of wireless transmission of time-signals. Here the lowest temperature was recorded on February 25 of 4° Fahr., and the heaviest snowfalls were

observed, due no doubt to the neighbourhood of the Himalayan range. On March 5 the expedition left Kargil during a heavy snowfall, and after crossing the Nawika La (13,000 feet) and the Fobu La (13,435 feet), arrived on the third day at Lamayuru (Ladakh). Here from the 8th to the 18th another set of geophysical observations and of wireless experiments was made.

Meanwhile, Prof. Dainelli, Lieut. Antilli and Marchese Ginori made a most interesting tour out of the beaten track through Ladakhi villages and monasteries, collecting many illustrations on the way. Lieut. Antilli has collected a considerable number of photographs, telephotographs, panoramas and cinematographs to illustrate the countries traversed by the expedition in regard to the scenery as well as to the social and religious manners and customs of the people. To these are to be added the photographs specially taken for topographical purposes, and for the geological and anthropological documentation.

The whole expedition was again collected together at Leh (11,280 feet) on March 22. Dr. De Filippi had arrived here twenty days in advance, to make the arrangements for transport. The supplies needed to feed men and animals from Leh onwards, and during the summer months in the Karakoram, had been collected in the preceding months. They amount to over fifty tons in weight, to which are to be added the provisions for the Europeans, the scientific equipment and camp baggage.

It is very fortunate for the present expedition that the old route from Leh to the Karakoram Pass, by the Khardong La, the Nubra valley and the Sasir Pass, which was hardly suited for loaded animals, and was only opened to caravans in July, has now been replaced by a new road, which crosses the Kilas range by the Chang La and then follows the upper Shyok valley to the foot of the Depsang plateau, where it joins the old track. The Chang La, although 18,366 feet high, is very easily crossed during the summer. At present, however, it is covered with deep snow, and a track had to be beaten through it by a large number of yaks and coolies, over which the transport caravans have begun to cross the pass. This is only possible thanks to the very exceptional endurance both of men and of animals.

Captain Gabriel, the Joint Commissioner for Ladakh, who resides in Kashmir during the winter, has very kindly lent the Residency Bungalow of Leh to the expedition. In the adjoining dak-bungalow the various laboratories have been installed, and near by are the meteorological, the astronomical and the wireless stations. All the usual observations are being made. The wireless signals are perceived unusually strong and distinct.

Prof. Dainelli left Leh on the 27th for a five-weeks' excursion up the Indus and the adjoining high plateaux. His object is to study the Rupshu Plains, and some of the typical closed basins, containing brackish lakes, such as the Tso Moriri and Pangkong, besides which he will have an

opportunity of making investigations on the Changpo, the nomad shepherds of the high lands.

After completing their work in Leh, Alessio, Abetti, and Ginori will also go up to the Rupshu Plains, to make pendulum observations at Moré, a station at an altitude of 15,427 feet. Here, in June, 1871, a gravimetrical determination was made by Captain J. P. Basevi, of the Indian Trigonometrical Survey. He died after two months, and the calculation of his observations led to results so peculiar that they were not generally taken into account, though giving rise to some very controversial theories. Therefore it is necessary that the determination should be repeated.

The usual work in meteorology, aerology and solar radiation will also be done at Moré. And the wireless station will also be put up with the view of investigating a possible new application of it. The results already attained in the determination of difference of longitude by the wireless transmission of time-signals, seem to justify the hope that the method, even in its present very simple form, may serve to determine the clock rate in the observations of relative gravity.

The second group of members of the expedition is expected to reach Leh by the end of April. It is composed of Major H. Wood, of the I. T. S., accompanied by two Indian Surveyors; Professors Marinelli, geologist and Alessandri, meteorologist, and Mr. J. A. Spranger, topographer. Prof. Alessandri, the Director of the meteorological observatory of Monte Rosa and of the meteorological station of the "Magistrato alle acque" of Venice, has replaced in the expedition Prof. Amerio, who was first enlisted, and has been unable to leave Italy.

It is hoped that all arrangements will be ready to allow the whole expedition to leave Leh early in March.

THE YALE UNIVERSITY AND NATIONAL GEOGRAPHIC SOCIETY PERUVIAN EXPEDITION.

By HIRAM BINGHAM, Director.

LAST month there sailed for Peru the topographical division of a new expedition. The chief engineer, E. C. Erdis, of the 1912 expedition, had sailed the week before. In a short time two more members of the expedition will sail, and as soon as the maps have been completed and are ready for use, the scientific members of the party will leave for the field. This will probably not be until early in 1915. As in 1912, the expedition is under the joint auspices of Yale University and the National Geographic Society. Unlike former expeditions, it will cover a period of two years, instead of being confined to one field season. Three members of the expedition, the chief engineer, the chief assistant, and the assistant topographer, will be in the field for a year and a half or more.

It is our plan to make a geographical reconnaissance of a portion of southern Peru, including the Cordillera Vilcabamba and portions of the Apurimac and Urubamba watersheds. This region is a part of the eastern edge of the great Andean plateau. The Cordillera Vilcabamba is a chain of dissected mountains rising 16,000 to 20,000 feet above sea-level, situated between south latitudes 12° and 14°. Their bases are clothed with tropical jungles, while their summits are mantled with snow and glaciers. In the main they are unexplored. As one of the most inaccessible parts of the Andes, they have been occupied from time to time by the ancient peoples of Peru. In this region are ruins of Macchu Picchu, Palcay, and Choqquequirau. The reported presence of other ruins and the actual existence of some that have been seen, but not studied or mapped, make the region a particularly attractive area in which to study the problem of man's origin and distribution in South America.

The character of the land formations in the neighbourhood of the ruins should enable something to be said in regard to the number of people formerly occupying the region, the causes of the location of cities, buildings and forts, and the reasons for their final abandonment. An examination of the ruins, studies of the styles of architecture, and of the artifacts and other remains that may be found fairly near the surface of the ground, should eventually enable a classification to be made, which, in connection with biological, physiographic, linguistic, and historical studies, ought to result finally in unravelling the puzzle of the ancient civilization of South America. From the standpoint of biology, this area is believed to contain a large number of species new to science. From the standpoint of anthropology, it is one of the least known and most fruitful areas in the Andes.

The plan of work will include the making of a topographical map of the region north-west of Cuzco between the Apurimac and Urubamba rivers; a detailed geographical reconnaissance of the more lofty portions of the mountains, including a study of the large undescribed glaciated region; the establishment of two meteorological stations at different elevations for the taking of systematic records for two years; a study of the distribution and history of food plants of this region; the collection of data respecting the forms and distribution of vertebrates, particularly mammals and reptiles; a survey of the present Indians inhabiting this region, including a study of their dialects, the collection of anthropometric data, and the collection and study of the skeletal remains; an archæological reconnaissance of the entire area, and a continuation of the studies begun by the first expedition, looking toward a geographical interpretation of the Spanish chronicles of the era of discovery and exploration, with particular reference to the identification of ancient place-names, the story of Macchu Picchu and its connection with the history of the Incas.

The staff of the expedition consists of: Chief engineer, Ellwood C. Erdis; geologist, Herbert E. Gregory, Silliman Professor of Geology in Yale University; osteologist, George F. Eaton, Curator of Osteology in

the Peabody Museum of Yale University; Albert H. Bumstead, topographical engineer; Osgood Hardy, chief assistant; C. F. Westerberg, assistant topographer; H. S. Arnold, M.D., medical adviser; Philip A. Means, assistant in archæology; L. M. Kirkpatrick, secretary. The surgeon has not yet been named.

RECENT VOLCANIC EARTHQUAKES.

By CHARLES DAVISON, Sc.D., F.G.S.

Two volcanic earthquakes of more than usual interest have occurred this year, one on January 12 in connection with the eruption of Sakurajima in South Japan, the other on the south-east flank of Etna on May 8.

Volcanic earthquakes as a rule possess certain features which are quite distinctive. The shock is remarkable for its sudden onset, its sharpness and brevity. The disturbed area is very small, considering the great intensity of the shock in the central region, showing that the focus must be at a very slight depth. The epicentre varies little, if at all, in position from time to time. In tectonic earthquakes, on the other hand, the shock begins with a series of tremors, its duration is often considerable, its intensity declines very gradually outwards from the central region, and the epicentre in successive earthquakes is subject to continual migration. Until January 12, there was no known instance of a volcanic earthquake disturbing seismographs at great distances from the origin.

Mount Sakurajima forms an island in the bay opposite the town of Kagoshima in South Japan. After lying dormant for more than a century, its activity was renewed early this year. The great outburst was, as usual, preceded by a large number of slight shocks. On January 12 alone 337 shocks were recorded in the south of Japan, the strongest of all being felt at Nagasaki at 6h. 29m. 27s. p.m., or 9h. 29m. 27s. a.m. Greenwich mean time. In its general features, this earthquake resembled an ordinary tectonic earthquake. Its duration was estimated at two minutes, and the vibrations at Kagoshima were so great that it was difficult for persons to stand. About half an hour after the earthquake, a seismic sea-wave swept over the low-lying part of Kagoshima, and this shows that there must have been a marked movement of the ocean-bed at a spot 50 miles or more from Kagoshima. Thus, the origin of the earthquake may have been separated by as much as 40 miles from the volcano of Sakurajima.

The interesting feature of this earthquake is its registration at distant observatories. At Laibach in South Austria, for instance, the first tremors arrived at 9h. 40m. 35s. a.m. Greenwich mean time, and, judging from the duration of these tremors, the earthquake must have occurred at

9h. 29m. 2s. and at a distance from Laibach approximately equal to that of South Japan. This time agrees so closely with that given for Nagasaki that it seems reasonable to conclude that the Laibach record was due to the earthquake in Japan.

The Sicilian earthquake of May 8 occurred within the Etnean boundary, its epicentre being at or close to the village of Linera, about 4 miles north of Acireale. The meizoseismal area was extremely small, covering only about 3 square miles; but within it all villages and houses were destroyed with a resulting loss of 150 or 160 lives. Another characteristic feature was the rapid decline of intensity outwards from the epicentre, implying a very small depth for the focus. Similar earthquakes have frequently occurred in the same district, and in several cases in close connection with Etnean eruptions. For instance, a disastrous shock in 1805 followed a volcanic outburst; another in 1859 took place during an eruption. In 1865, Fondo Macchia and other villages close to Linera were ruined by a violent earthquake, which occurred less than three months after the close of a great eruption. On September 10, 1911, less than four weeks after the last eruption, Fondo Macchia was again destroyed; and now, after a further lapse of two and a half years, the same district has been visited by a still more disastrous shock.

REVIEWS.

EUROPE.

Hannibal Once More.

'Hannibal Once More.' By Douglas W. Freshfield, M.A. London: Edward Arnold. 1914. Pp. 120. 3 *Maps and* 4 *Illustrations.*

Hannibal's route across the Alps, like the authorship of the 'Letters of Junius,' is a perennial source of controversy. The Carthaginian general in these later days has provided a subject for an essay to learned men instead of schoolboys. How the question stood half a century ago may be seen in the first volume of 'Ball's Alpine Guide,' where its conditions were briefly stated. The Little St. Bernard and the Mont Cenis, or rather the variant of that pass called the Petit Mont Cenis, were then the chief claimants. Both found zealous advocates, but the former, according to the author of that summary, involved greater difficulties. These, however, did not dishearten its supporters, and in 1879 the late Mr. Bosworth Smith, backed by the authority of Mommsen, encouraged them "to speak and write as if the question had been finally decided in their favour." This was more than Mr. D. W. Freshfield (who yields to none of our countrymen in his knowledge of the rival passes) could endure in silence. So he undertook a yet more thorough study of the whole subject, and, in 1879, contributed to the *Alpine Journal* the first of a group of papers, the material of which, with that of further researches, is incorporated in the volume before us. In it he strongly supports the claims of a pass, to the south of all the others, which had been left almost or quite unnoticed by his predecessors. This is the Col de l'Argentière, 6545 feet

above sea-level, which leads from the Durance valley south-west of Embrun to Cuneo in that of the Stura.

The chief ancient authorities on the passage of Hannibal are Polybius, who was born about B.C. 204 (some sixteen years after that event), and Livy, who was his junior by about 145 years. Hence, when the former wrote, rather late in his life, he would have had little difficulty in obtaining almost contemporaneous historical evidence, but neither he nor Livy appears to have personally studied the district traversed. From the account given by Polybius, which can in most respects be harmonized with that of Livy, the route should fulfill the following conditions: Four days' march from where Hannibal's army crossed the Rhone (which he had approached from Spain by way of the Eastern Pyrenees and the coast of southern Gaul), must be a district, called the Island by both authors, but defined by Polybius as a triangular area, bounded on one side by the Rhone, on another by the Isère, and on the third (that away from the apex) by a steep mountain range. Most critics agree that this must be the tract just north of Valence, between the confluent rivers and the limestone range of the Mont du Chat. The next condition is that after marching along the river-bank for 100 Roman miles (about 88 English miles) he must "begin the ascent of the Alps," that is, to judge from the context, must come to a place where the route becomes distinctly steep. Here the natives obstruct his advance and compel him to fight a battle, in which, though not without loss, he gains a complete victory, captures their town, and proceeds after a rest. Till four days afterwards his advance is easy. Then he is attacked by hill tribes while passing through a difficult ravine near a "strong white rock." Again he conquers, though it costs his army many lives, and on the ninth day (reckoning apparently from the beginning of the first struggle) reached the crest of the Alps without further difficulty. Here, as the summit of the pass was suitable for the purpose, he halted for another rest, and encouraged his disheartened soldiers with a distant glimpse of Italy. But before descending more than a short distance he was again in difficulties. The path ran along a slope so precipitous that a slip might prove fatal, and one part of it had been carried away. The place could not be turned, for loose snow (there had been a fall during the halt on the summit) was lying upon ice. That made the passage difficult for men, impossible for beasts of burden and elephants. A new road had to be made, after which serious difficulties were at an end, and on the fifteenth day from the commencement of the passage, Hannibal reached the Italian plain in the country of the Insubres. Thus the fourth and fifth conditions of the ascent were two districts favourable to attacks by hillmen, and the last one, natural difficulties soon after beginning a descent from the fairly spacious summit of a pass.

From the confluence of the Rhone and Isère Hannibal was bound to follow the latter river at any rate to the neighbourhood of Grenoble. Then he could choose between three courses. He might continue by its side till he began the ascent to its watershed. He might leave it at its confluence with the Arc and follow this till he found a convenient pass, or he might almost immediately quit the Isère for its tributary the Drac, and mount its valley till he could descend by a low and generally easy pass into the valley of the Durance, from which he could reach the watershed of the main chain by one of the eastern tributaries of the last river. It has indeed been suggested that Hannibal made for Briançon on the Durance by the Col du Lautaret, but apart from the elevation of this pass (6808 feet) we think any one who knows the Combe de Gavet and that still wilder gorge the Combe de Malaval, will not regard this idea with any favour. Mr. Freshfield disposes, successfully in our opinion, of the claims of the Little St. Bernard. We

think him equally successful in regard to the Col de Clapier, a variant of the Mont Cenis, which has recently obtained strong support, but its height alone, 8173 feet, and the very steep descent, amounting to about 4000 feet vertical, make this a most improbable route for an army. Several passes leading from the Durance valley may also be ruled out. Les Echelles de Planpinet, though the lowest of all (5774 feet), because the little rock wall at the beginning of the descent would have arrested the elephants; and two or three near the Viso, because they are not less than 9000 feet. We are thus left with a choice between the Mont Genèvre and the Col de l'Argentière, the one a little over 6000 feet, the other about 500 feet higher. Neither pass commands a view of Italy from its highest part. Indeed, if this be an essential condition, it excludes every pass but the Petit Mont Cenis. We have therefore to choose between accepting this route, or, with Mr. Freshfield, regarding the story, common to both Polybius and Livy, as a rather rhetorical embellishment, founded on the fact that the view from either pass is on the whole encouraging. We may further plead that the Latin author, by bringing Hannibal into the Durance valley, must repudiate either a pass leading from it or the view of the Italian plain. The occurrence of hard frozen old snow on the Italian side near the top of either pass is a real difficulty. An October fall of snow, as Mr. Freshfield points out, is not at all abnormal at that height, but we should have expected any remnant of winter snow to have disappeared during the previous summer. It might, however, as he suggests, be the relics of a spring avalanche, and this difficulty is but little greater in the case of the Col de l'Argentière than of the Petit Mont Cenis. A graver difficulty is that Mr. Freshfield has to place the slippery slopes of rock and ice, which so obstructed Hannibal, at the well-known gorge of the Barricades, and this, instead of being near the commencement of the descent, cannot be less than 7 miles away and 1200 feet below the summit.

Mr. Freshfield emphasizes a piece of evidence which has been too much overlooked. The learned Varro, who was born about fifty-seven years before Livy, enumerates five passes in the south-western Alps: the first is the well-known coast road (Turbie); the second, he says, was that crossed by Hannibal; "the third, by which Pompey went to the Spanish war; the fourth, by which Hasdrubal came from Gaul into Italy; the fifth which was formerly occupied by the Greeks and is called the Graian Alps." This last cannot well be anything but the Little St. Bernard, the Cenis would do very well for Hasdrubal, as he approached the Alps through some part of Auvergne; the Mont Genèvre has very strong claims to be that crossed by Pompey, which leaves Hannibal no other route than the Col de l'Argentière.

To sum up: we close Mr. Freshfield's book with the conviction that each of the routes proposed for Hannibal's traverse of the Alps presents its own difficulties; that these are insuperable in the case of all but the Petit Mont Cenis, the Mont Genèvre and the Col de l'Argentière; that they are graver than we had supposed in the case of the first; and in regard to the others, since we have seen only the Mont Genèvre, we prefer to say no more than that neither is free from difficulties. It is, however, a point in Mr. Freshfield's favour that he takes Hannibal through the Alps by a route which in 1515 A.D. was actually used by the army of Francis I. But, whatever may be the ultimate verdict, we are sure all students of history will be grateful to him for a summary of the evidence bearing on this question, for a discussion, generally destructive—in our opinion deservedly so—of sundry new views; in a word, for a scholarly, well-written and most interesting book. Should it need a second edition, as we hope it will, we should welcome an index.

A Great Volcano.

'Islands grösster Vulkan. Die Dyngjufjöll mit der Askja.' Von Dr. Hans Spethmann, Privatdozent für Geographie an der Universität Berlin. Leipzig: Verlag von Veit und Comp. 1913. Pp. 143. *Price* 6*m.*, *bound* 7*m.*

Dr. Spethmann here gives not only an account of his own examination of the volcano made in the years 1907 and 1910, but uses the experience of other travellers to compile a full description of the mountain, its relief, climate, vegetation, and history. Seen at a distance the Dyngjufjöll presents the appearance of a solid mass with summits of nearly equal heights, but on a nearer approach it is found to contain a huge caldron 21 to 23 square miles in area. In this, the Askja caldron, lies the Knebel lake, $5\frac{3}{4}$ square miles in area, and on the north-west bank the Rudloff crater which constantly emits vapour. Some have believed the Dyngjufjöll to be a single volcanic mountain, but though there are many indications that such is the case, Dr. Spethmann hesitates to decide the question until further observations have been made. On the other hand, he positively rejects Herr Reck's suggestion that it is a horst. The Dyngjufjöll with the Askja is a very old volcano. Over the present Askja stood a shield-shaped volcano of the Hawaiian type. Its summit fell in and squeezed out at the edges a stream of molten material which filled the caldron until it found an outlet through the Op. A large part of the present Dyngjufjöll owes its origin to a centre of eruption which lay within the limits of the present Askja, and formed stratified accumulations. Subsequently an effusion of molten material occurred which filled the basin of the Askja and overflowed through the ravines into the Ódádahraun. In January and March, 1875, violent eruptions of loose products took place, and at about the same time the basin which now holds the Knebel lake was enlarged. The caldron of the Askja is a good specimen of a stratified volcano subsequently flooded by a stream of fluid lava which did not entirely cover the older tuff formation. Had the eruption of lava been more extensive a shield-shaped volcano would have been formed like others in the neighbourhood of the Dyngjufjöll. W. A. T.

'Landeskunde der Schweiz.' Von Dr. Hermann Walser. (Berlin und Leipzig: G. J. Göschen. 1914. Pp. 147. *Map and Illustrations. Price* 90*Pf.*) Prof. Walser has compiled a clear and concise account of the country under the divisions of: the Jura; the lower country from the Lake of Geneva to the Lake of Constance, or the Middle Land as he calls it; and the Alps. The configuration is described with references to the geology, and the climate, lakes, towns, etc., are briefly noticed. A chapter is also devoted to the people, with statistics of race, religion, birth-rate, and mortality, the government, and industrial occupations. The small space available is judiciously portioned out, and the issue of this second and improved edition shows that the work has proved to be useful.

ASIA.

The Geography of Madras.

'The Madras Presidency, with Mysore, Coorg, and the Associated States.' By Edgar Thurston, C.I.E. Cambridge University Press, 1913. Pp. xii., 293. *Maps and Illustrations. Price* 3*s.*

A new series of Indian Provincial Geographies makes an excellent start with this agreeably written little book. It is clear that Mr. Thurston, who himself has a very special knowledge of most of the necessary subject-matter, has been able to command authoritative sources of information, and has had unusual

advantages in collecting the illustrations, which are of much interest, and really illustrate. Perhaps more sketch-maps would have been an advantage. The names of the geographical features described in chapters ii. and iii. are not all to be found in the rather inadequate folding map at the end of the book, in which, by the way, Mettupalaiyam is wrongly placed.

Besides the chapters dealing with the more strictly geographical aspects of the province, there are chapters on geology, meteorites, the economic uses of palms, archæology, architecture, the history and administration of the province, and industrial arts; and the book concludes with a "Roll of Honour," and a concise gazetteer of towns and villages. Personal experience, myth, legend, fable, superstitions, anecdotes, are all freely drawn upon to illustrate and explain the information given.

The book will prove an invaluable *vade mecum* for officials and others whose work lies in the so-called "Benighted Presidency," and may be read with pleasure and profit by those whose interest in Madras is of a less special character. It should certainly be in every school library in the province. Although the book has not been written down to the supposed requirements in matter and style of the pupils in Indian High Schools, this is no drawback to its use, under suitable guidance, as a class book, by pupils whose knowledge of English is sufficient to justify them in using text-books written in English.

W. H. A. W.

Mongolia in Transition.

'With the Russians in Mongolia.' By H. G. C. Perry-Ayscough and R. B. Otter-Barry. London: John Lane. 1914. Pp. xxii., 344. *Map and Illustrations.* 16*s. net.*

This book has come at an opportune moment to lift the veil that has hung over Mongolia, since she repudiated the suzerainty of the Chinese Republic. A significant change has occurred in the politics of Inner Asia, a Western power has once more asserted itself, and an Eastern nation has had to give way; the frontier map of the Chinese Empire requires some readjustment. The story of this change is laid before us by the joint authors, who are to be congratulated on their achievement: without their record we should be still in the dark as to the process by which this vast slice of Asia underwent a political evolution, and became a "buffer-state" between Russia and China. Mongolia, as the home of the race which was once paramount in Asia and even threatened Europe, is of special interest to students of Asiatic history; it possesses also a geographical aspect, for the physical features of Mongolia have much weight in settling the natural boundaries between the spheres of political influence. The account broadly includes a detailed *résumé* of the negotiations between China and Russia with regard to Mongolia, and a statement as to the present situation of that country, in all its aspects—Russian, Chinese and Mongolian. There is a good account of modern Urga, and much of new and special interest as regards the financial, commercial, and religious affairs of the second capital of the Buddhist world. The remainder of the book describes the actual travels of the joint authors, for the most part in bald diary form. From these chapters, however, much of interest can be gleaned by those who are intent on studying the exact situation, the progress of the Russian, the loss to the Chinaman, and the very peculiar but not altogether enviable position of the Mongol. In short, the book gives us an impartial account of the masterly way in which the enterprising and sharp-witted Russian used the peculiar position in which the Mongols found themselves on the downfall of the Manchus; it shows how she conciliated the

Mongols, and thereby removed once and for all further chance of Chinese expansion along her frontier; it tells us of the commercial possibilities of Mongolia, the strength of the Lama Church, and of the serious economic problems that beset the improvident and overtaxed nomads.

The authors suggest that Russia now holds the same position in Mongolia as she held in the Caucasus at the time of the Crimean war, and ask what amount of Russian influence will be felt in Mongolia sixty years hence? China's "right of suzerainty" cannot have any meaning nor be of any intrinsic value, the Mongols are neither capable nor contented—they are in a state of insolvency, the country is good—the southern borderland only of Outer Mongolia approaches the synonym "desert," while Siberian merchants, traders, gold-diggers and colonists are on the look-out for all that is worth exploitation. One can well speculate as to the place Russia will hold in Mongolia sixty years hence.

A significant point is the attitude of the Mongols themselves, who, by the way, seem to have been altogether in the background during the negotiations between their recent master and their new protector. At present they find themselves in no better position from the change—they have merely been handed over from Chinese extortion to a heavier taxation by their own princes, to meet the demands of an increased expenditure; Chinese traders supplied them at a lower price, being content with small profits, the new Russian exploiters want to make 50 per cent. profit, or if they are "patriotic" are content with only 20 per cent.

The authors point out the responsibility Russia incurs in her dealings with this fine country, and its small population of priest-ridden, child-like shepherds, who seem to be utterly incompetent even in their own special business of cattle-rearing. Russia has stopped the progress of the Chinese in this direction, and thereby no doubt saved the Mongols from annihilation, and it remains to be seen what she can make of this effete but ancient race.

This is all very interesting, and the authors are to be thanked for putting before us the most recent facts in connection with this newly-created Asiatic problem. The illustrations are, as they should be in this case, chiefly of people, for the book deals with the human, not the physical, aspect of the country. Yet those who read between the lines will realize the geographical significance of this story of Mongol severance from the Chinese Empire, for Outer Mongolia is Siberia rather than China, and the physical features of the region tend to create the natural boundary between the two empires as existing in a broad, neutral Gobizone.

The map at the end of the volume portrays Dzungaria as included in Mongolia: as a matter of fact it forms a portion of Sin-Kiang, a Chinese province, and has nothing to do with Mongolia. D. C.

'Colloquies on the Simples and Drugs of India.' By Garcia da Orta. (New ed., Lisbon, 1895, edited and annotated by the Conde de Ficalho; translated by Sir Clements Markham. London: Sotheran. 1913. Pp. xxi., 509. *Illustrations.*) This volume renders available in English, in a limited edition, an interesting discussion in the form of question and answer on Indian medicinal and other plants, and on a wide range of subjects connected with this department of early study. Garcia da Orta's work was originally published in 1563. Its strictly geographical interest lies mainly in the direction of information as to the distribution of many plants, the local variations in the quality of their products, the conditions under which they flourish, and so forth. Sir Clements Markham has supplied an introduction, and has carefully indexed the authorities (with

biographical notes in some cases), plants, minerals and place-names mentioned in the text.

AFRICA.

Bornu.

'The Sultanate of Bornu.' Translated from the German of Dr. A. Schultze, with additions and Appendices by P. Askell Benton, B.A., Third Class Resident, Bornu Province. Humphrey Milford, Oxford University Press. 1913. *Maps.* 7*s.* 6*d. net.*

It is a pleasure to have Dr. Schultze's monograph on Bornu in an English dress; the pleasure is enhanced and the value of the volume much increased by the numerous additions made by Mr. Benton, perhaps the most diligent British student of Bornu matters. Dr. Schultze dealt with history, topography, climate, flora, fauna, ethnology, and commerce, and gave a list of authorities. Mr. Benton has added largely to the bibliographical entries, prints lists of the Bornu kings—one drawn up by Mr. Vischer, another, hitherto unpublished, made by a Bornese *mallam*. In other appendices relevant material from the 'Documents Scientifiques de la Mission Tilho' is translated into English; there is an account of Rabeh from the German, by Julius Lippert, some Kanuri derivations, and other matter. With praiseworthy zeal Mr. Benton has again consulted that mine of curious information the Tripoli Correspondence of the Foreign Office, as also the archives of our own Society, for personal details concerning Oudney, Denham, Clapperton, and other early explorers, and the result is fifty pages of unpublished correspondence, pages which help greatly to visualize for us the men who opened the road to the Central Sudan. Mr. Benton is keenly interested in these gallant pioneers; one wonders if he is acquainted with Disraeli's reference to Denham and Clapperton in 'Vivian Grey,' published a few weeks after the appearance of the 'Narrative of Travels and Discoveries in Northern and Central Africa.'

The greater part of the old sultanate of Bornu lies within the British protectorate of Nigeria, and with wise handling we may expect it to recover much of its lost importance. A considerable future may also be predicted for German Bornu. Therefore, this volume, which gives all that the busy man need know about the country and its inhabitants, is doubly welcome. At some, perhaps not long distant, date Bornu will be linked by railway with the Niger, with the Kamerun coast, and with the Nile. Its agricultural and pastoral wealth will be greatly increased, and its commerce vastly developed. There is, Nachtigal declared, "scarcely any country in Central Africa which, if the efforts of mankind corresponded to the powers of the soil, offers a more beneficent prospect of rapid development." It is to this land that Mr. Benton provides an admirable handbook.

Scrupulous accuracy marks, in general, Mr. Benton's citations. It is to be regretted that he writes of the "Journal of the Royal Geographical Society," when he means the "*Geographical Journal.*" It might cause confusion with the series that ended in 1880.

F. R. C.

Dry-farming in South Africa.

'The Conquest of the Desert.' By William MacDonald. London: T. Werner Laurie, Ltd. 1913. Pp. 197. *Photographs.* 7*s.* 6*d.*

"The last Romance of Agriculture, the most daring of its many triumphs, is the Conquest of the Desert." In this fashion, Dr. MacDonald opens his account of the development of Gordonia at the expense of the Kalahari. Such progress

depends upon three essential factors—population, conservation, and afforestation. The district of Gordonia is about three times the size of Yorkshire, and two-thirds of it is unsurveyed desert given up to the semi-savage natives whose existence depends upon the *tsamma* melon. The district has a frontage on the Orange river 200 miles in length, where there are long narrow farms of about 3 miles width resting on the river, and from 15 to 18 miles in length stretching northwards. The region has three kinds of good soil, river silt in the dried-up river-beds; sandy loam, which yields good crops under dry-farming; and alkaline or brak-land, suitable for the treatment adopted in similar lands in California. Dr. MacDonald treats of the Kakamas labour colony, describing the methods by means of which it is possible to raise a crop of wheat, 30 bushels to the acre, on rainless land, and devotes a chapter to the value of "dip" to ranching industries in South Africa. He devotes attention to natural features connected with the Orange river, the "eye of Kuruman," and the "Cataracts of King George," and quotes Dr. Bartholomew's promise that, in future, maps issued by his firm shall bear the latter title for the Great Falls of the Orange river. He concludes with a forcible appeal for emigrants.

B. C. W.

SOMALILAND.

'My Somali Book.' A record of Two Shooting Trips. By Captain A. H. E. Mosse, F.Z.S. Introduction by Colonel H. G. C. Swayne. London: Sampson Low & Co. 1913. *Illustrations.* 12*s.* 6*d. net.*

This book makes its special appeal to the brotherhood of big-game hunters, from whom it should receive a very cordial welcome. Captain Mosse is, however, more than a mere slayer of big beasts—he is also a naturalist, and in chapters xiv. and xv., "General Notes" and "Protective Colouration in Animals," he discusses, with considerable knowledge, questions of much general interest. Having considered Mr. Selous' objections, Captain Mosse holds to the belief that the need for concealment has been "in all probability" the chief factor in determining existing schemes of colouration among animals.

The author, on his two trips, saw much of British Somaliland, and he gives us good descriptions of the country and its inhabitants, so good that many readers will regret that he did not write a book of travel pure and simple. He has an attractive style, while the interest of the book is enhanced (in addition to the usual photographs) by a number of clever little sketches of men, places, and things by Lieut. D. D. Haskard. A sketch-map should have been, but is not, given.

F. R. C.

UGANDA.

'The Handbook of Uganda.' Compiled by H. R. Wallis, C.M.G., Chief Secretary to the Government. Published for the Government of the Uganda Protectorate by the Crown Agents for the Colonies, London. 1913. *Illustrations and Sketch-map.* 2*s.* 6*d. net.*

This handbook of the Uganda Protectorate has been very carefully compiled, and it contains almost all the information which the traveller, the official, and the trader interested in the country is likely to need. Each province is separately described. There are also chapters dealing with anthropology, zoology, entomology, meteorology, agriculture, health, communications, etc. With a little trouble future editions might be made even more useful. The index should (and very easily could) be bettered, a bibliography should be added, explanations

of the meanings of native titles might be more freely given, and the language section improved generally. The historical sketch is somewhat too official in tone, justice being scarcely done to the work of the missionaries. We can, for instance, find no mention of Alexander Mackay, to whom Uganda owes as much as to any one man. A better plan than that followed would be to collect all the historical matter into one narrative. It is now scattered over six chapters. Also a better map might well be given. Regions, *e.g.* Buddu, frequently mentioned in the text, do not appear on the map, nor are the Murchison falls marked. These suggestions must not be taken as depreciatory of the handbook as it stands; it is the best concise account of Uganda yet published, and, in sober language, tells the tale of as marvellous a development of an African race and country as has ever been seen.

F. R. C.

The Congo State.

'Histoire de l'Etat Indépendant du Congo.' Par Fritz Masoin. Namur: Imprimerie Picard-Balon. Vol. 1, 1912; vol. 2, 1913.

As the result of four years' study of the question—a study begun, the author assures us, with an open mind, Monsieur Masoin has come to the conclusion that throughout his career as sovereign of the Etat Indépendant du Congo, Leopold II. was animated by the loftiest motives; that the campaign against the State was engineered by men animated by the most ignoble motives, and that the evil which many of the Protestant missionaries in the Congo have done, "the systematic vilification which has filled their apostolate," etc., is not compensated for by the results obtained by some of their colleagues who were devout and upright men. It will be seen that these volumes do not contain that impartial history of the Congo State which is sadly needed. But we heartily agree with Monsieur Masoin in his appeal to Belgium to give of her best to the country for which she has accepted responsibility.

The appendices contain much useful information. They include a list of explorers who crossed Central Africa from ocean to ocean during the nineteenth century; the nationality, the points of departure and arrival, and the date of the journey being given in each case. This list begins with the names of Livingstone, Cameron, and Stanley. Tables of the Belgian Expeditions to Lake Tanganyika during 1878–1882, and of the expeditions sent out by the Société anti-Esclavagiste in 1890–1893, are given, and the treaties and conventions concluded by the Congo State are enumerated.

No map accompanies the volume, nor is there any systematic attempt to set forth the geographical factors which underlie the story of the Congo.

F. R. C.

Egypt and the Sudan.

'Egypt in Transition.' By Sidney Low. Introduction by the Earl of Cromer. London: Smith, Elder & Co. 1914. *7s. 6d. net.*

Mr. Sidney Low's object in writing this book was, he tells us, to convey some insight into the political, social, and administrative conditions of Egypt and the Sudan at the close of Lord Cromer's tenure of office as British Agent at Cairo. That object has been attained, and more than attained, for in most respects the story has been brought down to the close of 1913. The story itself is told in a series of vivid, arrestive chapters, which leave clear-cut pictures both of land and people. Mr. Low is not, we imagine, a scientific geographer, but he is fully conscious of the part which geographical factors play in the history of

every country. No writer on Egypt and the Sudan could indeed make an intelligible book who ignored those factors; it is to Mr. Low's credit that he frankly frames his studies in a geographical, or rather hydrographical, setting, and insists on his readers gaining a grasp of the *régime* of the Nile. Though one or two statements regarding the Nile system call for correction in subsequent editions, they do not affect the accuracy of the conclusions respecting irrigation problems. There is merit, too, in the plan followed of going with rather than against the stream. That is, we are taken first to the Sudan and thence trace the Nile downwards to Upper Egypt and the Delta. The magic and mystery of the river itself are shown in word-pictures of much beauty. The finest chapters are, however, those in which the work of the British in the Sudan is described. They will enable many people to realize better than they have hitherto been able to do precisely what has been achieved and how much remains to be done.

The book has a good index and some portraits; the latter we would willingly exchange for a map.

F. R. C.

'Further Reminiscences of a South African Pioneer.' By W. C. Scully. (London: Fisher Unwin. 1913. Pp. 384. *Illustrations.* 10*s.* 6*d.*) This volume will probably be acknowledged by most readers to reach a higher standard of public interest than did its predecessor, and will render a promised third volume, to deal with the period of the war in South Africa, the more welcome. Here the writer describes very vividly his travels and official labours in South Africa before that period, and the book contains instructive incidental references to climatic and other natural conditions, to natural history and to the native peoples in various parts of the country. There are a few valuable topographical photographs.

AMERICA.

'Colombia.' By P. J. Eden. (London: Fisher Unwin. 1913. Pp. xxiv., 312. *Maps and Illustrations.* 10*s.* 6*d.*) The "South American Series" receives in this volume an addition well up to its standard. Apart from the bare description of the country, there is plenty to interest the geographer here: for example, the railway communications of Colombia, based as they are largely on the river Magdalena as a central artery, are closely studied—with results, it may be said, not to their advantage as regards the manner in which they have been laid out and organized. The economic and political conditions of the country do not present that favourable record which is to be found in some other volumes of the series, but, subject to revision of political conditions, the writer believes there is material in Colombia and among its people for the history of a prosperous future.

'A Church in the Wilds.' By W. Barbrooke Grubb. (London: Seeley, Service. 1914. Pp. 287. *Maps and Illustrations.* 5*s.*) The writer of this book established the work of the South American Mission among the natives of the Paraguayan Chaco, and he travelled widely over unexplored ways in that region. He is here concerned to describe not so much the region itself as its inhabitants and his relations with them, but many particulars about this difficult country emerge. As to his own work, it may be permitted to remark upon his wide view as to the propriety of leaving unaltered the native practices and habits of life so far as they are not strictly incompatible with Christian teaching.

POLAR REGIONS.

De Quervain's Crossing of Greenland.

'Quer durchs Grönlandeis. Die schweizerische Grönland-Expedition, 1912–1913.' Von Dr. Alfred de Quervain. Mit Beiträgen von Prof. Dr. P. L. Mercanton und Dr. A. Stolberg. Verlag von Ernst Reinhardt in München. 1914. Pp. 196. *Price 4m.; bound 5m.*

In 1912 Dr. de Quervain set out for Greenland with a party of Swiss to traverse the island. Sailing from Copenhagen on the Greenland steamer to Godthaab, he was carried thence northwards in the *Fox* to Jakobshavn, and at length landed in a bay of the Ata sound. Three days were spent in carrying the stores up the rocks of the coastal zone, and the sledge journey was then commenced, Dr. de Quervain being accompanied by Gaule, Fick and Hössli, while Prof. Mercanton with Stolberg and Jost returned to the west coast, there to carry out observations in the upper atmosphere with kites and balloons. The ground in the moraine region was slushy and full of lakes, and even on the plateau the party was often delayed by huge crevasses. The highest point, 2510 metres (8230 feet), was reached on the twenty-third day (out of twenty-nine, that is, nearer the east coast; the latitude and longitude are not given). This height is less than Nansen's maximum, but Dr. de Quervain could see that the inland ice rose to the north, and Dr. Koch found last year a much greater elevation. As the party was descending to the east coast dome-shaped mountains were seen to the left, that is, to the north, and the highest, rising to 2760 metres (9050 feet), was named Mont Forel. After leaving the inland ice Dr. de Quervain came to three rocky ridges separated by inlets running southwards, which he had to examine before he could find the depôt he had caused to be made on the shore of the Sermilik fiord, opposite Angmagsalik. As a result of his journey he has been able to draw a section across the inland ice 700 km. (435 miles) long, with latitudes correct to 6 inches of arc and longitudes to two or three seconds of time. He also made anthropological measurements and collections, the craniological material from the pure Eskimos of the east coast being especially valuable. The party which remained in west Greenland sent up balloons 120 times, and established the fact that even in the winter months there is no uniform polar vortex even in the upper layers of the atmosphere. Prof. Mercanton and Dr. Stolberg relate their experiences during the summer and winter they spent in West Greenland, in the neighbourhood of Ata sound. The volume contains several illustrations, a map showing de Quervain's route, and sketch-maps of the peninsulas at the Sermilik fiord and of the coast region of Ata sound.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Mountain Structure.

'Mountains: their Origin, Growth, and Decay.' By James Geikie. Edinburgh: 1913. Pp. 336. 81 *Plates*. 12*s*. 6*d*. *net*.

The formation of mountains, as one of the most important and necessarily one of the most speculative branches of physical geography, is a subject of constant discussion and progress. Prof. James Geikie is well known for his powers of clear exposition and he has made a lifelong study of mountain phenomena; hence geographers will turn to this book with eager interest to read his matured conclusions on the problems of mountain structure. He classifies mountains into two main groups—the original and the subsequent. The second group is often known as that of residual mountains, for they are the residues of tracts of

elevated land carved by denudation. The first group, the original or tectonic mountains, he subdivides into mountains of accumulation—those which are piled up by volcanic action, by glaciers, or by wind as in sand-dunes; and mountains of deformation—those formed by the crumpling or unequal elevation of parts of the Earth's crust. Mountains of deformation are far more important than all the rest. As representative of this group, Prof. Geikie selects the Alps, to which he devotes four of the five descriptive chapters on this class of mountains. He clearly explains Steinmann's views on the formation of the Alps, but without warning of the difficulties; and the reader cannot help wishing that the book had been less impersonal and that the author had given us the benefit of more definite statement of his own conclusions and more criticism of the various theories.

Three of the chapters of the book are based upon papers which the author has published elsewhere, and in one of them he reprints his weighty criticism of Suess's views on the origin of the foredeeps in the oceans. The author remarks that the solution of that difficult problem, the structure of the north-west highlands of Scotland, was solved by Scottish geologists; but neither Bonney nor Lapworth belong to that category, and their names are not mentioned.

The book is popularly written, and it should be of great value to British tourists in Switzerland who wish for a modern statement of current speculations as to the origin of the Alps. The illustrations are of exceptional beauty, and the book includes an excellent map of the Pacific ocean and its deeps.

J. W. G.

THE MONTHLY RECORD.

THE SOCIETY.

The Awards for 1914.—The Royal Medals for 1914, which were presented at the Anniversary Meeting on May 18, were given as follows. The Founder's Medal to the distinguished German geographer Prof. A. Penck, who has advanced by his investigations almost every branch of scientific geography. Besides his important works, 'Morphologie der Erdoberfläche,' and 'Die Alpen in Eiszeitalter,' he is the author of more than 200 papers on geographical subjects, and to him was originally due the idea of an International map of the world on the millionth scale, in the preparation of which most countries of the world have now promised their concurrence. The Patron's Medal was given to Dr. Hamilton Rice, for his meritorious work in filling in the large vacant space in the map of South America drained by the headwaters of the Orinoco and the northern tributaries of the Amazon. Of the other awards, the Murchison was given to Commander Pennell, for his important services in Captain Scott's Antarctic Expedition, 1910–1913; the Gill Memorial to Mr. A. F. R. Wollaston, for his exploring work in Central Africa, Dutch New Guinea, etc.; The Cuthbert Peek Grant to Dr. J. Ball, for his valuable scientific geographical work in Egypt; and the Back Bequest to Mr. I. N. Deacopoli, for his careful survey and other work in the Sonora desert of Mexico in 1911–12, and for his East African Expedition of 1912–13.

EUROPE.

The Chiltern Wind-gaps.—The disputed question of the origin of these gaps is once more discussed by Prof. J. W. Gregory in the April number of the *Geological Magazine*. On the analogy of the Vale of Pickering, drained through a gorge cut by the overflow of a glacial lake, Mr. F. W. Harmer suggested in 1907 (*Quart. Journ. Geol. Soc.*; see also *Geogr. Journal*, vol. 31, p. 215) that not only the Goring gap by which the Thames makes its exit from the Oxford plain, but the other and higher gaps through the Chilterns, originated in a similar way—the latter at a time when the lake stood higher and was drained towards the Wash. Prof. Gregory doubts the correctness of this explanation. He points to the almost entire absence of old beaches and deltas round the site of the supposed Oxford lake, and to the impossibility that such a lake could have stood at the level necessary for the *initiation* of even the deep gaps at Tring, Wendover, and Saunderton. As to the supposed modern appearance of the gaps, Prof. Gregory thinks they do not differ markedly from some of the valleys in the Wealden downs—almost certainly pre-glacial. The glacial origin of the plateau gravels of the Chilterns is also open to grave doubt. The wind-gaps, he thinks, may best be explained as pre-glacial valleys, excavated by rivers now beheaded by the Thames.

ASIA.

Recent Fall in the Level of the Caspian.—General de Shokalsky has contributed to the *Annales de Géographie* (March 15, 1914) an interesting paper on the marked fall in the level of the Caspian which set in about the middle of 1910, and which was maintained, and even exaggerated, during 1911 and 1912. The suddenness and extent of the fall have even led some to suggest that subterranean settlements, such as might be expected in a region subject to seismic disturbances and near the petroleum fields of Baku, may have been its cause. This is not thought probable by General de Shokalsky, who, from a careful study of the fluctuations of level, coupled with those of the discharge of the Volga, thinks that a deficiency of rainfall may be a quite sufficient explanation of the phenomenon. The observed fluctuations of level are of three kinds —those of quite short period of the nature of a seiche; those with a yearly period; and those of an irregular character due to winds. The yearly fluctuations are similar at the different observing stations, and must therefore be due to general causes. The mean of observations made for 23 years at Baku (and for a shorter period at Kuuli on the opposite shore) shows a regular rise from March to July (in which month the maximum almost invariably occurs) followed by a fall, rapid till October, and then progressing more slowly till the minimum is reached at some date between December and March inclusive. The records for 1910 and following years show monthly departures from the mean in all cases in excess of the extreme departures during the previous period, while the mean level for the year, which was in 1910 about 21 cm. below the average, had fallen by the end of 1912 to about 44 cm. below the average. A study of the discharge of the Volga shows that this was below the mean during 1910 and the first ten months of 1911, the deficits for the two years being, at Samara, 29 and 13·5 per cent. respectively. In 1912 the normal discharge was once more reached. General de Shokalsky calculates the fall in the level of the Caspian which would have been produced during the years in question by this diminution of the volume of the Volga, and finds it somewhat less in each case than the observed fall. This was to be expected, as there are other factors (including the amount supplied by the lesser streams of the basin) which cannot

be calculated precisely from the available data. Similar, and even greater, falls in the level have been observed in the past, notably between 1853 and 1862.

Note on the name Saltoro.—The following note by Colonel G. P. Lenox Conyngham, R.E., of the Survey of India, has been forwarded to us by Colonel Burrard, who expresses his concurrence with the views therein expressed:—"The name Saltoro is frequently used by Montgomerie and others as the name of a river, and on Indian Atlas Sheet 44A S.W. (1868), and on a map in the *Geographical Journal* of 1864, it is used as the name of a district or tract of country. It was first applied to a pass by Younghusband. He had been told that there was a pass from the Oprang valley into Baltistan, and, as he thought that it would give access to the Saltoro basin, he decided to call it by this name. It will be remembered that he was baffled in his attempt to cross the pass, and so did not discover that he was mistaken in this idea, and that the Siachen glacier, the main source of the Nubra river, lies between the basins of the Saltoro and the Oprang. From Sir F. E. Younghusband's remarks in the discussion which followed Mrs. B. Workman's paper on her visit to the Siachen glacier (*Geographical Journal*, February, 1914), he admitted that he called the pass Saltoro because it was the best name that occurred to him. It is clear, therefore, that if he had known the true lie of the land he would not have used this name. In the survey of India map, published in 1890 to illustrate Sir F. E. Younghusband's explorations, the name Saltoro is given to a pass which is shown as connecting one of the glaciers of the Saltoro basin with the Oprang Valley; no name is given to the glacier. This part of the map is based on Sir F. E. Younghusband's account, and naturally shows the same imperfect knowledge of the geography. In chart No. XX. of the Sketch of Himalayan Geography and Geology the name Saltoro pass occurs, but this chart is derived from the above-mentioned map, so that the use of the name in it is not fresh evidence. It seems to be clear, therefore, that the use of this name for a pass depends wholly on Sir F. E. Younghusband's guess. In the Atlas sheet already mentioned (44A S.W.) the several glaciers of the Saltoro basin are named; one of them is called the Bilaphond. When that sheet was drawn it was not known what lay beyond, and the topographical detail ceases at the watershed. We now know that at the top of the Bilaphond glacier there is a pass which gives access to the Siachen. For this pass the name Bilaphond La is proposed by Mrs. B. Workman, and as the name Bilaphond seems well established, it is quite appropriate that the pass should be called after it. The pass which Sir F. E. Younghusband attempted to cross must be on the other side of the Siachen glacier, and must lead over the main watershed, which separates the Nubra from the Oprang—India from Turkistan. Henceforward it would seem advisable to discontinue the use of the name Saltoro for a pass, and use it for the river only; to adopt the name Bilaphond La for the pass connecting the glacier of that name with one of the branches of the Siachen; and to await the definite discovery of a pass from the Siachen to the Oprang before considering what to call it."

Deflection of the Plumb-line in Northern India.—The abnormal deflection of the plumb-line which has been observed at stations near to the southern edge of the Himalayas has been repeatedly alluded to in recent years in the publications of the Survey of India, and has attracted considerable attention.*

* A high northerly deflection has been found to reach its maximum along the southern margin of the range, decreasing on both sides; the amounts observed

It was fully discussed by Colonel Burrard in 1912 in his memoir on 'The Origin of the Himalayas' (Survey of India, Profess. Paper No. 12), in which he put forward as an explanation the probable existence of a deep rift in the lower layers of the Earth's crust, filled in course of ages by material of a lower specific gravity than the rock-formations on either side. Colonel Burrard supposed the formation of this rift to be closely connected with the origin of the Himalayan range, suggesting that, with the resulting horizontal contraction of the sub-crust beneath the range (not due, in his view, to loss of heat, as the isostatic compensation shows that it *decreased* in density), the upper crust was also compressed into a smaller area, with consequent wrinkling. This view, which is opposed to the ideas of Suess and others regarding the geological history of Asia, has, naturally, not found general acceptance with geologists.* It is pointed out that a rift of such magnitude (supposed to extend downwards some 20 miles, with a width of only, perhaps, 5) is far in excess of anything for which there is geological precedent, and that it is desirable to consider whether some other explanation cannot be found, more in accordance with geological evidence. It is the view of Indian geologists that, south of the great fault which marks the southern margin of the Himalayas, there is a depression in the rock framework, deepest on its northern edge, and gradually shallowing southwards, which has been filled with the alluvium now constituting the Gangetic plain. The specific gravity even of the oldest and densest member of these deposits—the Siwalik beds—is known to be much less than that of the rocks forming the main Himalayan range, and it is asked whether the presence of this wedge-shaped mass of sediments, rather than the rift suggested by Colonel Burrard, may not explain the observed anomalies. After a full discussion of the geodetic evidence, Mr. Hayden concludes that this seems to confirm the generally accepted view of the nature of the Indo-Gangetic depression. Colonel Burrard, it may be remarked, considered the possibility of a great sediment-filled syncline as the explanation of the observed facts—but only to reject it on account of the great depth which, according to his calculations, it would be necessary for such a syncline to attain. Mr. Oldham calculates that the deflections observed would be compatible with a depth such as is actually supposed to be reached by the depression—but along its northern margin, not along its median line. He finds that, whereas, north of the Himalayan boundary, there would be no great difference in character between the deflection curve deduced from Colonel Burrard's hypothesis and that resulting from the accepted geological structure, to the south the difference would be radical, and that the actual changes in the residuals are not such as would occur on the hypothesis of a rift.

The Railway Connection between India and Ceylon.—The Indian papers report that the connection effected on the 24th of February last between the Indian and Ceylon railway systems is already working successfully and has proved a useful aid to the development and progress of the two countries. Although one part of the journey is by ferry steamers, the through bookings will at least break the isolation that has hitherto characterized the railway system of Ceylon. The completion of the undertaking, too,

differing considerably from those which would result from the *visible* topography. These differences or "residual deflections" have been calculated by Major Crosthwaite (Survey of India, Profess. Paper No. 13).

* The question has been discussed from the geological side by Mr. H. H. Hayden, Director of the Geological Survey of India (*Records*, vol. **43**, part 2), and by Mr. R. D. Oldham (*Proceedings, Royal Society*, A, vol. **90**, 1914, pp. 32-41).

naturally recalls the legend of the Ramayana which identifies the islands, shoals, and reefs extending between India and Ceylon with the remains of a causeway said in the great Indian epic to have been built by Rama, with the aid of an army of monkeys, to enable him to recover his consort Sita who had been carried off by Rama, the demon king of Ceylon. Five days, so the legend goes, sufficed for the construction of the causeway, which thus ran from India to Ceylon and enabled Rama to complete his journey and recover his queen. On his return from Ceylon, Rama, as an act of gratitude, founded a temple on the island, called after himself by the name of Ramesveram. The question of railway communication was first definitely taken in hand in 1895, and in the ensuing year a narrow-gauge line was constructed from Madura to Mandapam, the extreme south-eastern point of the Indian mainland, also a line in Ramesveram island for the convenience of pilgrims to the great temple there, as well as the extension of the broad-gauge Ceylon Government railway to Jafna. In 1910 sanction was given for bridging the Pamban strait in order to link Ramesveram island with the mainland; also for extending the Ceylon railways from Madawachi junction to Talie-manar at the west end of the island Manar; for constructing marine piers there and at Danushkodi, the respective termini of the Ceylon and South Indian railway systems; and for establishing a service of ferry steamers between them pending the through connection by rail across the reefs of Adam's bridge. Such a connection, 22 miles in length, is strongly advocated in Ceylon, and is bound to come sooner or later since there are no insuperable engineering difficulties. The Pamban viaduct, the most interesting engineering part of the scheme, runs from Point Raman, the eastern end of the narrow promontory which constitutes the extreme section of the Indian part of the connection, and crosses the Pamban strait to Ramesveram island. The viaduct consists of 145 spans with a two-leaf Scherzer rolling lift bridge over the passage, through which coasting vessels having a draught not exceeding 12 feet are permitted to pass. The ferry service between Danushkodi jetty and Talie-manar is carried on by three turbine steamers named the *Elgin*, *Curzon* and *Hardinge*, in honour of the three viceroys under whose *régime* the scheme has been carried through. Accommodation is provided for Indian and European first-class passengers, and for the large coolie traffic between Southern India and Ceylon, which will form one of the main sources of traffic revenue of the new connection.

Mr. C. Boden Kloss in Malaysia.—The well-known naturalist, Mr. C. Boden Kloss, who accompanied Mr. Wollaston in his ascent of the snowy range of Western New Guinea, and whose more recent journey in the Malay peninsula was referred to in the February number of the *Journal*, writes to point out that he was not accompanied, as was there stated, by Mr. H. N. Ridley, whose concurrence consisted in the description of the plants collected. The name of the mountain was also given incorrectly by a printer's error, the real name being Menuang Gasing (not Kasing). At the time of writing (21st March) Mr. Kloss was engaged in an expedition, with Mr. H. C. Robinson (Director of Museums, Federated Malay States), to Mount Indrapura or Korinchi in Central Sumatra—a volcano 12,700 feet high and the highest summit in the island. It was ascended and described in the middle of last century by the Mid-Sumatran expedition, but no other account has since been published. The objects of the expedition are zoological and botanical, but it is hoped to ascend to the summit of the mountain and make observations of the crater and the present activity of the volcano.

Earthquakes in the Philippines.—For nearly twenty years, the Rev. M. Saderra Maso has devoted continuous attention to the earthquakes of the Philippine islands. His papers on the subject are not very accessible, and the first of the memoirs noted below * is therefore welcome as giving a summary of his studies and of the conclusions at which he has arrived. Earthquakes are usually attributed to one of three causes. Slight local shocks may be due to rock-falls in underground channels; others, somewhat stronger, but still restricted in area of disturbance, to volcanic explosions; the remainder, including the most violent and widely felt of all, are tectonic or connected with the growth of the Earth's crust. Father Saderra Maso considers that all three causes are responsible for the Philippine earthquakes. During last August and September, a series of 348 shocks (described in the second of the above memoirs) were felt in the sub-province of Benguet, in Luzon. They occurred at the close of the rainy season and in a limestone district, in which subsidences of the ground are frequent. Most of the shocks were slight, and the disturbed areas so small as to indicate that the foci were extremely shallow. It is therefore possible, as the author suggests, that these shocks may have been caused by rockfalls in channels in the limestone or by movements along secondary faults close to the surface. In many respects, they resemble the earth-shakes which are felt from time to time in our mining districts, and which are probably due to small fault-slips precipitated by the working of the mines. Of volcanic earthquakes, those which accompanied the eruption of the Taal volcano in 1911 may be regarded as typical. Beginning on January 27, they increased in frequency and strength with the activity of the volcano until, early on the morning of the 30th, the greatest known eruption of the volcano took place. The eruption itself was brief, but the earthquakes continued until February 7, the total number of shocks recorded at Manila, 39 miles distant, being 995. In the whole area of the Philippines, the authors delineate twenty-five districts in which earthquakes are of frequent occurrence. In five of these, the shocks are ascribed in large part to rockfalls and volcanic activity. The earthquakes of the other twenty districts are attributed to tectonic causes, and their distribution is of some interest. While no part of the islands is free from earthquake-effects, and few provinces do not contain some epicentres, the most numerous and violent disturbances occur along the eastern coasts of the islands, and especially in eastern Mindanao (in which the Agusan river valley has been the seat of the greatest number of violent earthquakes during the last fifty years) and the east coast of Samar. In part the Philippine islands are arranged in the festoon form common to the Japanese, Kurile, and Aleutian chains of islands; and, as in other cases, the convex side of the festoon faces the Pacific, is bounded by great ocean depths, and is marked by excessive seismic frequency. It is worthy of notice that the enormous depth of 5350 fathoms (or more than 6 miles) is reached at a distance of 37 miles from the north-east coast of Mindanao, the narrow "deep" of which it forms a part extending parallel to the coast as far as Samar island.

AMERICA.

The Georgian Bay Ship Canal was the subject of a paper by Sir R. W. Perks read at a meeting of the Society of Arts on February 3 of this year and

* (1) M. Saderra Masó and W. D. Smith, "The Relation of Seismic Disturbances in the Philippines to the Geologic Structure." The *Philippine Journal of Science* (Manila), vol. **8**, 1913, pp. 199-232.

(2) M. Saderra Masó, "The Benguet Seismic Period, August 23–September 26, 1913." *Bulletin* of the U.S. Weather Bureau (Manila), 1913.

printed in the *Journal* of that Society for February 13. It gives a useful *résumé* of the history of the project, an outline of its main features according to present ideas, and an estimate of the effects to be anticipated in the economical development of Canada. The construction of a waterway to connect the St. Lawrence with the upper three of the great lakes, and so to enable ocean-going steamers to transport the grain and other products of the west from the lake ports to the ports of Europe by a route passing entirely through British territory, has engaged attention for more than half a century, but various causes have stood in the way of its execution. A charter given to a company in 1894 was renewed in 1898, and steps were taken to make complete surveys, plans, and estimates, the engineers' report being submitted in 1903, and definite proposals put before the Government in 1907. Meanwhile the Canadian Government had appointed a commission to consider the whole scheme, and this issued a full report (of which a copy is to be found in our library) in 1909. Although recent railway development has kept the canal scheme somewhat in the background, it has received sympathetic consideration from the Government, and it is hoped that a new step in advance may not be long delayed. The proposed canal is 449 miles long, starting from 12 miles below Montreal, and ascending the Back and Ottawa rivers, past the city of Ottawa, and reaching the divide by the Mattawa river, and the small Talon, Turtle, and Trout lakes. It thence passes through Lake Nipissing, and descends the French river to Georgian bay, on Lake Huron. Of the whole distance, the entirely artificial portions make up only 30 miles, while 332 miles are a natural waterway over 22 feet deep. By starting below Montreal, room will be given for the enormous amount of harbour and port accommodation that will be necessary where the canal joins the St. Lawrence. The total number of locks on the canal will be twenty-three, three on the west and twenty on the east of the divide. They will be 850 feet long, with a width of 65 feet and a depth of 24 feet on the sill. The divide will be cut through for 5 miles, and the three upper lakes will be thereby lowered to the level of Lake Nipissing, which will be converted into an inexhaustible reservoir, providing all the water for lockage purposes. The main channels will be 200 feet wide with a maximum depth of 22 feet. The time taken on the journey will be seventy hours. It is pointed out that Chicago and Milwaukee (with a population, together, of nearly three millions) will be brought 412 miles nearer to Montreal than they now are to New York by the Erie Canal, and 794 miles nearer to Liverpool than by Buffalo and the Erie canal. Fort William and Port Arthur, on the Canadian shores of Lake Superior, will be brought 282 miles nearer to Montreal than by the Welland Canal route. Along the canal a vast amount of water-power will be available, and it is anticipated that the valleys of the Ottawa and Mattawa will become one vast industrial centre. The Government estimate of the total cost is about £24,000,000.

New Canadian Trans-continental Railway.—The second of the three Trans-continental lines of railway with which Canada will shortly be provided—the Grand Trunk Pacific—was completed early in April by the laying of the last mile of rail at the Nechaco river crossing in British Columbia. The third line of through communication, the Canadian Northern Railway, is also advancing rapidly in its western section, and its early completion is likewise anticipated.

Geography in the United States.—The American Geographical Society and the Association of American Geographers held their first joint meeting (cf. *Journal*, April number, p. 449) on April 3 and 4, in New York. Thirty-five members of the Association were present, and the general attendance ranged

from forty to sixty-five. Besides an evening lecture on the Magnetic Survey of the Earth by Dr. L. A. Bauer, the programme included nine papers, most of them studies of serious geographical problems, which may be taken as examples of the kind of geographical work now being done by American students of the science. Among the subjects dealt with (some of which might well suggest themes to our own students desirous of taking up research work in geography) were the following: "Land Sculpturing in Arid Lands, with observations from North-Eastern Africa," by Prof. W. H. Hobbs; "The platforms of Barrier Coral Reefs," by T. Wayland Vaughan; "Botanical Phenomena, and the Phenomena of Coastal Subsidence," by D. W. Johnson (cf. paper by the same author in *Journal*, vol. 42, p. 152); "Characteristics of the Mississippi Delta," by E. W. Shaw; "Geographic Influences in American Political History," by F. J. Turner; "The Tree as a Factor in Man's Adjustment to Hilly and Rocky Land," by Prof. J. Russell Smith. At Prof. Salisbury's invitation, the next annual meeting of the Association will be held at Chicago on dates to be subsequently announced, and a special subject proposed for discussion is the question of "Physiographic Regions and Boundaries," which will be introduced by Prof. N. M. Fenneman.

Mr. Roosevelt's Journey in South America.—The newspaper reports on the expedition across South America which Mr. Roosevelt has lately completed are too vague (and in part contradictory) to justify any attempt to give a connected account of the journey, for which purpose fuller details must be awaited. Mr. Roosevelt, whose chief object in making the journey appears to have been the collection of natural history specimens, had been last heard of on the borders of Paraguay, whence he made his way through the Brazilian province of Matto Grosso to the lower Madeira, and so down the Amazon to Pará. His route is said to have been down a hitherto almost unknown tributary of the Madeira, rising just north of 13° S., and entering the main stream in about 5° 30′ S. after a very tortuous course, much broken by rapids, which gave the party much trouble during their six weeks' voyage down it. No Indians were met with during the descent. We have no information as to the means by which positions were fixed during the journey, but should those mentioned in the telegraphic reports prove even approximately correct it would seem as though some of the upper tributaries of the Madeira have been brought in existing maps too near the basin of the Tapajos, as no room has been left for an independent river between the latitudes of 8° and 13° S. But the labelling of portions of this area as "desconhecido" in the Brazilian maps shows that no claim to precision in the representation of the region has been put forward. Several tributaries have been shown as joining the Madeira between 5° and 6° S., but no opinion can yet be hazarded as to which of these is the river followed by Mr. Roosevelt. Although itself only a tributary of the Amazon, the system of the Madeira is on so vast a scale that the new river will but add one more to the many large streams descending from the highlands of Bolivia and Matto Grosso which unite to form the Madeira in its lower course. The natural history specimens collected are said to number over 2000.

AUSTRALASIA AND PACIFIC ISLANDS.

Murray River Storage Scheme.—A new and important scheme for the further development of irrigation in Australia by the storage of the water-supply of the rivers has received official sanction in an agreement arrived at between the Prime Minister of the Commonwealth and those of the States interested, at the Annual Premiers' conference held early in April. The first scheme of the kind on a large scale was that for the utilization of the waters

of the upper Murrumbidgee by the building of a great dam at Burringjuck ("Barren Jack") which was carried out by the New South Wales Government (cf. *Journal*, vol. 29, p. 230). The new proposal is for a similar but still more important undertaking, by which the water of the upper Murray will be impounded by a weir to be constructed at Tumbarumba, the capacity of the reservoir so to be formed being considerably greater than in the case of the Murrumbidgee. Included in the scheme is the provision of a series of locks on the Murray from Echuca downwards, as well as on either the Darling or Murrumbidgee. The cost of carrying out the scheme will be over 4½ million pounds, of which one million will be provided by the Commonwealth Government, and the rest shared equally between the three states interested. Of these New South Wales and Victoria will take equal shares of all water passing Albury, leaving, however, in the river all that may be needed by South Australia for navigation purposes. This new water-supply is bound to have an important effect on the development of agriculture and stock-raising in this part of Australia.

Mr. A. F. Wollaston's Map of his Explorations in Dutch New Guinea.—The scale of this map, published in the *Geographical Journal* for March last, is wrongly stated on the map. It should be 1 : 400,000 or 1 inch to 6·31 stat. miles.

Melanesian Migrations.—In a paper on this subject forming Ergänzungsheft No. 7 to the *Mitteilungen a. d. Deutschen Schutzgebieten* (Berlin, 1913, pp. 182, with map), Dr. Georg Friederici of Dorlisheim endeavours to trace the routes followed by the original Melanesians when they first came to the Solomon islands and the New Hebrides. The Alfura, starting from Serang and Soela (Moluccas), sailed first northwards, then passing north of Waigeöl turned to the east-south-east and coasted the north coast of New Guinea. Near Dampier strait they divided into three parties. One group proceeding north-east reached New Mecklenburg; another went along the coast of New Guinea as far as Port Moresby and Kiwori; a third traversed Dampier strait and travelled *viâ* Woodlark, New Georgia, Malaita and so on to Efat, in the New Hebrides. The Philippine migrations starting from Palawan (Philippines), and North-Eastern Celebes, went nearly east-south-east by Sangi, Morotai, Admiralty islands, Choiseul, Malaita and Banks island, also reaching Efat. This suggestion is not new, for it has been given by Hamy in part and also by Ray and Schmidt. The author has worked out these routes by careful comparison of the grammar and vocabulary of the various islands, and his paper is full of interesting information on linguistic questions. Various anthropological and ethnological details are also given, which, according to the author, on the whole confirm his views. Those who believe that arguments from language are of real use in questions of human migration will probably be convinced by the author's arguments. It is difficult also to see, if the supposed migrating swarms once started along this chain of islands, how they could have gone in any other direction.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Contemporaneity of the Glacial and Pluvial Periods.—A paper by Mr. Charles E. P. Brooks, entitled "The Meteorological Conditions of an Ice-sheet and their Bearing on the Desiccation of the Globe," was recently read at a meeting of the Royal Meteorological Society, and published in the Journal of that Society for January 1914. The author produces evidence to show that during the glacial epoch in northern Europe, the present rainless tracts of the Sahara and Arabia, etc., were much better watered, and endeavours to explain the altered distribution of the rainfall in the following way. In the

first place, he concludes from such data as are available from both polar regions, that the two great land ice-sheets at present existing on the Earth, namely, those of Antarctic and Greenland, are the site of more or less permanent anticyclones established by the severity of the cold, and argues from this that a similar atmospheric circulation formerly prevailed over those parts of Europe, North America, and other regions covered by an ice-sheet. Precipitation is very small in glacial anticyclones, but there is evidence, as already mentioned, that during the great ice-age the rainfall over the non-glaciated areas of the Earth like the Sahara was so far increased as to bring about a pluvial period. The explanation given of the simultaneous increase of moisture in the tropical belts with the great extension southwards of the north polar ice-cap is mainly twofold: firstly, that the postulated northern anticyclone pushed the rain-bearing cyclonic systems which at present prevail in northern and central Europe further to the south; and secondly, that during the ice-age the temperature gradient between the equator and the poles was greater than it is now, a circumstance which involved a quicker circulation of the atmosphere, and hence greater evaporation and rainfall. A cool, moist period in the low-land tropical belts, moreover, fits in perfectly with the well-supported supposition that the ice-age was a period of lower temperature over the whole Earth, and that the extensive local glaciations in the northern and southern hemispheres were approximately coeval. In the discussion which followed the reading of Mr. Brooks's paper, Dr. W. N. Shaw dwelt upon the subject of present-day Antarctic circulation, and quoted high authority against the real existence of an Antarctic anticyclone. Apart, however, from the question of anticyclonic circulation, precipitation must in any case be small over intensely cold glaciated polar regions, so that we may perhaps somewhat modify Mr. Brooks's conclusion and say that the increased cold in the polar regions certainly gave rise in some manner to increased rainfall in the equatorial, probably though not necessarily the result, in great measure, of anticyclonic circulation in the dry glaciated regions. Whilst the intense glaciation in high latitudes was caused by severe cold, the excessive glaciation in the tropical mountain ranges was occasioned by the heavy snowfall.

GENERAL.

Geographical Distribution of the Wild Sheep.—In the February number of *Petermanns Mitteilungen*, Dr. R. Kowarzik discussed the geographical distribution of the various species and sub-species of wild sheep, and endeavoured to lay down the main principle involved in such distribution. Taking in turn the separate quarters of the globe in which wild sheep are found (principally Asia and North America, though a few varieties linger in Corsica and Sardinia), he finds in the facts observed a striking confirmation of the law propounded by Matschie that *water-partings* constitute the most important dividing line between the habitats of different species of animals. That such a line of separation should be effectual in the case of an animal so much at home in mountain ranges as the wild sheep certainly seems surprising, and the writer enters into no consideration of the reasons why certain species should be restricted to certain river systems, contenting himself with pointing out the many cases in which the supposed law appears to hold good. Where it does not, at least with the present configuration of the surface, he somewhat light-heartedly has recourse to supposed changes in surface configuration by which the facts may be squared with the theory. Thus the occurrence of four different types of wild sheep in the hydrographical system of the Caspian sea is explained as the result of a former division

of this sea into a number of separate basins. Similarly the existence of separate forms in the basins of the Oxus and Syr-daria (both debouching into the sea of Aral) is attributed to the different course once followed by the Oxus. A similar former separation is postulated for the Obi and Irtish, to account for the different types now to be found in their respective basins. The special form occurring in the basin of the Uda, which now empties itself into the Sea of Okhotsk, is supposed to have established itself at a time when the bay into which the river flows was an isolated lake. In none of these cases is the evidence for the assumed changes (some of which can no doubt be substantiated) in any way put forward. Apart from these instances, the distribution of the forms on a hydrographical basis (which the author illustrates by maps) certainly seems noteworthy, and the conclusions might have been none the less acceptable had the author abstained from undue pressing of the theory in the more doubtful cases.

Honour to Miss Semple.—Miss Ellen Churchill Semple, well known for her writings on anthropogeography, has received the Cullom medal of the American Geographical Society (New York), in recognition of her services in that field. Miss Semple is the first woman to receive the medal, her five predecessors having been Peary, Scott, Amundsen, Shackleton (all Polar explorers), and Prof. W. M. Davis of Harvard. The presentation was made on March 24 in the presence of a large gathering.

Livingstone College.—In view of the approaching resignation of Dr. C. F. Harford, who has been in charge of Livingstone College since its foundation twenty-one years ago, the Committee has appointed Dr. Loftus E. Wigram, at present Vice-Principal of the College, to succeed him as Principal. Dr. Wigram is the youngest son of the late Prebendary Wigram, formerly Hon. Secretary of the Church Missionary Society, and before joining the staff of Livingstone College had practical experience in the field as medical missionary at Peshawur.

The Third International Congress of Tropical Agriculture will meet in London, at the Imperial Institute, from June 23 to 30. The Congress enjoys influential support, on the part both of governments and of institutions interested in tropical agriculture and colonial development, and a large number of papers on cotton, fibres, rubber, cocoa, and other important tropical products have been promised. Membership tickets are issued at £1, and tickets for ladies accompanying members at 10s. Communications are to be addressed to the Organizing Secretaries of the Congress, Imperial Institute, S.W.

OBITUARY.

The Duke of Argyll, K.T., etc.

THE Society has a special reason for sharing in the universal regret at the death of the Duke of Argyll, which took place as the result of pneumonia on May 2 last, the Duke having been its President for a year, in 1885–86, when still Marquis of Lorne. In this capacity he delivered the opening address at the first meeting of the Session in November, 1885, and the anniversary address in the following May. The year was one in which important decisions were come to by the Council in regard to the steps to be taken for the improvement

of geographical education in this country, as a result of Dr. Keltie's report, and the subject was sympathetically referred to in both addresses. Known to the public throughout the greater part of his career as Marquis of Lorne (he succeeded his father, the eighth duke, in 1900), it is under this title that he will no doubt be best remembered, firstly in connection with his marriage with H.R.H. the Princess Louise in 1871, and secondly, as Governor-General of Canada from 1878 to 1883. He held many other posts and dignities, which it is unnecessary to enumerate here, and was Unionist M.P. for South Manchester from 1895 to 1900. Among other publications, he was the author of a collection of 'Canadian Pictures' (1885), and of a small volume on 'Imperial Federation' published in the same year.

Eduard Suess.

By the death of Eduard Suess, the world has lost the most stimulating and original thinker since Lyell in the field where geology and geography overlap. Suess was born in London, on August 20, 1831. His father, a Saxon by race, was then engaged in business as an importer of Bohemian wool; but as this trade declined with the pastoral development of Australia, the family removed to Prague in 1834, and finally settled in Vienna in 1845. Suess was destined for a commercial career, but his scientific interests prevailed, and after studies in the Universities of Prague and Vienna he was appointed in 1852 to an assistantship in the Geological Department of the Hof-Museum in Vienna. His work here was palæontological; he wrote especially on the brachiopods, and was one of the pioneers in founding their modern classification and in subdividing Ammonites into many distinct genera. In 1857 he was appointed Extraordinary Professor of Geology in the University of Vienna, and in 1862 he resigned his appointment at the Hof-Museum to devote himself exclusively to University work. In 1867 he was appointed to the Professorship, and he retained the Chair till 1901.

Although most of Suess's own geological work was essentially theoretical, he was always interested in the economic applications of geology. His first paper, published in 1850, was on the mineral waters of Karlsbad, a subject to which he returned later when he established their juvenile or plutonic origin, and thus did much to stimulate the growing belief in the continual addition to the surface waters from the interior of the Earth. He was a consistent advocate of the view that the Rand goldfield was formed as a placer deposit.

In 1862 he published a work on the economic geology of Vienna, in which he indicated the influence of geological conditions on its development and sanitation. He advocated the abandonment of the old water supply and the introduction of a fresh supply from the Alps. His scheme was adopted and completed in 1873, when, in gratitude for this great public service, Suess was elected an Honorary Burgess of Vienna. He served for ten years on the Municipal Council of Vienna. In 1869 he was elected to the Landtag or Diet of Lower Austria, and from 1873–1876 he was a member of the Austrian Parliament, where he was one of the Liberal leaders.* His political interests led him to devote much time to economics. He was an enthusiastic bimetallist, and wrote two works, 'The Future of Gold' (1877), and 'The Future of Silver'

* These dates are those given in 'Wer ist's?' 1909.

(1892), in which he pointed out that, judged by the available evidence, the supplies of the two metals would render it necessary to make a fundamental change in the basis of currency. The enormous development of the gold supply, due mainly to the introduction of the cyanide process, however, altered the basis of his calculations.

Prof. Suess's greatest influence was achieved by his success as a teacher at Vienna, and by his contributions to structural geography. In 1875 he published his 'Origin of the Alps,' in which he showed their place in the mountain system of Europe and their connection with the great basins to the south of them. This work led on to his masterpiece, 'Das Antlitz der Erde' ('The Face of the Earth'), which will be his most lasting monument. It was published in four volumes and an Index volume, between 1885 and 1909. The subject is an investigation of the geological causes of the geographical plan of the Earth. He undertook a general review of the surface structure of the Earth in order to discover the factors that have controlled its geographical evolution.

The work begins with a study of crustal movements, which is marked by his early insistence on the dependence of earthquakes on faults. Most of the first volume is occupied with a study of the distribution and nature of mountain chains, which Suess recognized as the framework of the land. He established the now accepted contrast between the outer side of a chain of fold mountains where the earth-waves break against opposing land masses, and the inner side where, behind the waves, the land sinks in great basins such as those of the Mediterranean area. He showed, moreover, that successive earth-foldings in the same region are due to pressure from the same direction. Thus in Europe and North America the main earth-waves have always advanced northward, and accordingly the European chains are convex towards the north, and the foundered basins are to the south; in Asia, on the contrary, the waves have travelled from the north, the mountain arcs face southward, and the foundered areas lie to the north.

To the south of the great line of fold mountains of Eurasia he recognized the existence of a great southern continent, Gondwanaland, the existence of which is now almost universally admitted.

In his second volume Suess announced the startling results of his studies of the geological history of the oceans. He established his well-known rule that the Atlantic and Pacific are essentially distinct in structure, and were formed at different ages. His most revolutionary doctrine was repudiation of the view that the emergence and submergence of the land are always due to its own rise and fall. From the time of Playfair it had been almost universally accepted that the sea-level is invariable, while the lands are liable to constant and irregular fluctuations in level. Lyall admitted that the sea-level might change, but he treated this process as comparatively unimportant. Suess adduced a series of facts which show that changes of sea-level are inevitable, and that they take place on a world-wide scale. At one time the sea advances on the land all the world over in a great marine transgression; at another, there is a marine "regression," when the land shows an equally widespread emergence from the sea. Suess justly insisted that such movements cannot be explained by local movements of the land. On this question Suess's views have now met with general acceptance; and as they have supplied the most precise method of correlation, they have exercised a profound influence on modern geological work. Suess, however, went further, and claimed that the raised beaches which are so conspicuous in Scandinavia and Scotland were also due to variations of sea-level, and not to movements of the land. The rise

of Northern Sweden he attributed, not to its uplift, but to the emptying of the Baltic sea in consequence of a climatic change; and he explained the raised shore-lines of the circumpolar areas by an alternate advance of the sea towards the poles and its retreat to the equator. Suess advocated this view in accordance with his principle that a widespread uniform uplift of the land is mechanically impossible. This principle does not appear essential to Suess's main doctrines, and his elaborate and ingenious statement of his arguments have failed to convince most geologists of the existence of this great oceanic seiche, or to overthrow the general belief that widespread uplifts of the land have often occurred.

The third volume is mainly devoted to the structural geography of Asia, and it is probably the most valuable of the four volumes, for it was written after an army of Russian investigators in Siberia had discovered the main facts in the geology of Northern Asia; but their work—much of it written in Russian—was little known, until Suess, with the help of Russian collaborators, mastered it and revealed its lessons to the world. His third volume will always rank as one of the primary documents in the physical geography of Asia.

The concluding volume revised the mountain systems of America, Africa, and Oceania, and discussed various petrographic and palæontological problems which bear on the main problem. But this volume did not realize all the expectations with which it had been so eagerly awaited. Suess had explained that the main present task of the geologist is to determine the plan of the trend-lines on the Earth, and thus to establish a classification of the fold mountains which would explain terrestrial folding by some simple expression. His last volume shows that he had not only failed to find any such simple expression, but was convinced that no simple explanation of the plan of the Earth is possible. He has collected all the available essential facts, and he has made important contributions to the elucidation of the structure of all parts of the world. But he appears to have concluded that the plan of the folding resulted from agencies which had worked in the earliest period of the consolidation of the Earth, and that irregular, thickened areas of the primæval crust had controlled the distribution of all subsequent crustal folds. The cause of these thickenings he appears to have regarded as lost beyond recovery.

The general truth of Suess's main principles, and the supreme importance of his work, have been generally recognized; but his conclusions were once strenuously opposed. Some Continental critics attacked him with a bitterness that can only be explained by personal prejudice against his resolute anti-clericalism. His geographical conclusions also roused opposition, for they were at variance with some prevalent currents of thought. The theory of the permanence of oceans and continents was inconsistent with his axioms, and it is probably largely due to his influence that the theory has now been so generally rejected by geologists. The view that geological time was brief he dismissed without discussion. "We look," he says in one of his graphic sentences, "over the ocean of time, but nowhere do we see signs of a shore." The recognition of the value of Suess's work is now world wide. He received the Copley Medal of the Royal Society, the Wollaston Medal of the Geological Society, and was the honorary member of many of the leading scientific academies. His great work has been translated into English and French, and M. de Margerie, the editor of the French edition, has brought the work up to date by abundant footnotes, and remedied the main inconvenience of the original—its poverty in sketch-maps. The work has taken a secure place

among scientific classics, and, in spite of its necessary technicality, it is adorned by many passages of lofty eloquence, for Prof. Suess had the imagination of a poet as well as the patience of a master craftsman. As geologist, geographer, economist, educationalist, and politician he ranks as one of the intellectual giants of his generation.

J. W. GREGORY.

Robert L. Reid.

At his mother's residence in Brighton, on April 16, there passed away, at the age of fifty-five, Mr. Robert L. Reid, a well-known explorer and mining expert, whose name has appeared from time to time in recent years in the *Geographical Journal*. An Australian by birth, he was educated, with his brothers, by tutors on his father's station in Queensland, where his early years were spent. After his father's death he went into business with his brothers; but the love of travel and adventure was too strong in him to permit of his settling down to this kind of life. His first experience as an explorer was gained in 1900–03, in connection with a big-game expedition in Portuguese East Africa; and during this he made a sketch-map of the Gorongoza and Sheringoma territories, which was published in the *Geographical Journal* in 1905. During his earlier experiences, Mr. Reid obtained a good knowledge of mineralogy and geology, which he afterwards turned to practical account. After his first African expedition he spent some six years or more in the employ of the Belgian Government, examining the mineral and other resources of the little-known region between the Congo and the Nile. The maps of that region at the time were of the roughest character, and in order to do some good survey work, Mr. Reid took a course of instruction with this Society's instructor, with the result that he was afterwards able to fix the position of places by astronomical observation, and produce a map of the whole of the Aruwimi; also, in conjunction with his brothers, Messrs. C. A. and A. E. H. Reid, mapping a considerable portion of the region to the north of that river, both of which surveys were published in the *Geographical Journal*. For this work he was, in 1911, granted the Cuthbert Peek Award of the Society.

In 1910–11, Mr. Reid was again back in Portuguese East Africa, although in another locality, and the *Geographical Journal* for July, 1913, contained a paper by him, accompanying a map showing the geographical results of the Memba Minerals Expeditions, which was in great measure adjusted to astronomical positions determined by him.

His last field of labour was Nigeria, from which he returned in April, 1913. Influenza in a very severe form was contracted soon after, from which he never properly recovered, although the direct cause of his death was Addison's disease.

An indefatigable worker, thorough and painstaking in all he undertook, a keen observer from whose notice little of importance was likely to escape, fearless and brave, Mr. R. L. Reid was eminently suited for the career to which he devoted his life; and his death will be greatly regretted by the many friends by whom he was greatly esteemed, both for his personal character and exceptional abilities.

Emile Gentil.

The death of M. Fernand Foureau, of whom a notice appeared in the May number of the *Journal*, has been quickly followed by that of another French

pioneer in Equatorial Africa, who likewise played an important part in the linking up of the French possessions in that region. While Foureau's work consisted in opening up a route to Lake Chad from the French sphere in the north, Gentil made for the same objective from the south. He had already seen several years' service in the French Congo (as the territory was then named) when, in 1895, he started north for the lake, taking with him a small steamer in sections (the *Léon Blot*), which was to be the first steam vessel to float on its waters. Proceeding up the Ubangi to its great bend, he founded a station on one of its tributaries leading in the desired direction, and transported the steamer overland to the Nana, belonging to the basin of the Shari. After many delays, the voyage to the lake in the *Léon Blot* was begun in May, 1897, and was successfully accomplished, the open water of Chad being reached on November 1, while surveys were also made of various branches of the Shari, and relations opened with the ruler of Bagirmi. This paved the way, in spite of the temporary opposition of the notorious Rabah, for a permanent occupation by France of the whole territory up to Lake Chad, and the eventual junction of the French spheres to the south and north of the lake. An account of this important undertaking was given by M. Gentil in 1902, in his work 'La Chute de l'Empire de Rabah,' published by Hachette, the geographical results being summarized in an appendix. M. Gentil's subsequent work, valuable as it was for the consolidation of French influence in this region, was rather administrative than geographical.

CORRESPONDENCE.

Dehra Dun, India, April 6, 1914.

Is the Earth drying up?

At the close of the lecture on the Desiccation of the Earth, given by Professor Gregory, before the Royal Geographical Society on December 18, and published in the *Geographical Journal* for February and March, 1914, Lord Curzon pointed out that men of science have refused to accept the opinions of travellers that Central Asia has been undergoing desiccation within the historic period. Lord Curzon concluded his speech by appealing to outsiders to come to the support of Sir Thomas Holdich and the travellers, who have been obliged to retreat before Prof. Gregory and his followers. Will you allow me in response to Lord Curzon's invitation to suggest an explanation that does not seem to have been mentioned during the discussion?

The "men of science" have based their conclusions upon world-wide observations, and they maintain that there has been no change in the climate of the Earth within the last 3000 years. Travellers have formed their opinions from local observations in Central Asia, and they maintain that there was much more water in that region 3000 years ago than now.

The problem, then, is this:

How can the climate of a large portion of Asia have altered considerably in 3000 years, when the climate of the Earth has not appreciably changed?

The solution that I beg to suggest is this: 8000 or 9000 years ago immense quantities of ice and snow were covering the high mountains of Central Asia; these accumulations had been deposited there during the Glacial Epoch. The rivers of Central Asia have been fed for the last 8000 years mainly from the glacial deposits of the Ice Age; the deposits are now becoming gradually exhausted

and the rivers are drying up. The people of Central Asia have been living upon capital, in the shape of stored water, imagining it was income.

The climate of the Earth has varied in different geological ages between aridity and humidity, between cold and warmth. The last Ice Age occurred only a few thousand years ago, and *even now the Earth may not entirely have emerged from it.*

The Ice Age is still before us in the Antarctic. Greenland is still under an ice-sheet and the mountains of Central Asia still carry snow and ice.

The Greenland ice-sheet owes its existence not to present meteorological conditions, but to the fact that masses of ice were deposited there some thousands of years ago, and have not yet been melted.

All over the Himalaya and the Hindu Kush mountains there are indications of an extension of the ice, in recent times, to much lower levels than at present.

Glaciers in the Southern Himalaya now end at 12,500 feet, whereas the remains of Post-Tertiary terminal moraines are to be seen in many places at 7000 feet, and occasionally even at 5000 feet. It is reasonable to believe that 8000 or 9000 years ago the accumulations of ice on the Himalaya mountain was greater than at present, and that 8000 years hence they will be less.

The annual rainfall in Western Tibet is less than 4 inches, and I do not think that the presence of glaciers and of perpetual snow on the Kuen Lun mountains can be explained by existing meteorological conditions.

S. G. Burrard.

The Bearing of the Facts revealed by Antarctic Research upon the Problems of the Ice Age.*

Recent Antarctic explorations and researches have yielded significant evidence regarding the problems of the Ice Age, and of the similarity of the succession of geological climates in polar with those in other latitudes.† These researches have been prosecuted to the ultimate limit of courage, devotion to duty and endurance—the noble sacrifice of life—as in the case of Captain Scott, R.N., and his devoted companions.

The data secured by the expeditions under his command are alone sufficient to establish the following premises :—

(1) That Antarctic ice, although covering areas several times larger than all other ice-covered areas, is slowly decreasing in extent and depth.

(2) That the same succession of geological climates have prevailed in Antarctic as in other latitudes.‡

So vital are these evidences of the retreat of Antarctic ice that it may be well to briefly recite or refer to some of the prominent instances :—

"All these evidences and many others which space will not allow me to mention, lead up to one great fact—namely, that the glaciation of the Antarctic regions is receding.§

---

* This term as used by the writer refers to the Great Ice Age of Pleistocene time. He holds that the occurrences of ice as a geological agent of magnitude during eras preceding the Pleistocene were not "world-wide," nor were they accompanied by results as significant as those of the Ice Age ('Compte Rendu du XI[ème] Congres Géologique International,' p. 1105. Stockholm, 1910).

† 'Scott's Last Expedition,' vol. 2, p. 206.

‡ This part of the evidence is not considered in this paper except inferentially as bearing upon the general subject.

§ Scott, 'The Voyage of the *Discovery*,' vol. 2, p. 416. See also pp. 423–4–5, and sketch-map of Ice Distribution, p. 448.

"The ice is everywhere retreating." *

"The high level moraines decrease in height above the present surface of the ice, the *débris* being 2000 feet up near the coast and only 200 feet above, near the plateau" (Scott's lecture on the Great Ice Barrier).†

This observation applies to an ice-covered area of over 116,000 square miles. Mr. Griffith Taylor notes the recession of Dry Valley glacier, 20 miles from the sea below Taylor glacier.‡ Mr. Taylor also notes and speaks with confidence of the passage of the Ice Age from Antarctica.§

This impressive and conclusive evidence is corroborated by the greater and still more impressive evidence of the comparatively recent uncovering of temperate land areas,‖ and the progressive retreat of the snow-line to higher elevations in temperate and tropical latitudes and towards the poles at sea-level. We are, therefore, confronted with the conclusions—

(1) That the disappearance of the Ice Age is an active present process, and must be accounted for by activities and energies now at work, and that the use of assumptions and hypotheses is not permissible;

(2) That the rates and lines of retreat are and have been determined by exposure to solar energy and the temperatures established thereby, and by the specific heat of the land and water hemispheres;

(3) That the lines of the disappearance of ice are not conformable with those of its deposition, and mark a distinctly different exposure and climatic control from that which prevailed prior to the Ice Age. This retreat also marks a rise in mean surface temperatures along these new lines, manifestly due to recently inaugurated conditions permitting the trapping of heat derived from solar radiation, which process is cumulative and its maximum not yet reached.

The researches under Captain Scott's direction have therefore very rigidly conditioned any inquiry as to the causes of glacial accumulation and retreat. These conditions are corrective and directive. Corrective, in that they have entirely removed any doubts as to the alternate glaciation of the poles under the alternate occurrence of aphelion and perihelion polar winters by the precession of the equinoxes, as advanced by Croll; directive, in that they have imposed an appeal to energies now active and divested the problem of resorts to the fascinating but dangerous uses of suppositions and hypotheses.

They have, moreover, pointed out with unerring accuracy the vital conclusion that the same energies which have but recently converted the glacial lake-beds of Canada into the most productive grain fields of the world, will in time convert the tundras of to-day into the wheat fields of to-morrow.¶

The bearing of this conclusion upon the ultimate development of the human race is so far reaching in its consequences that the great sacrifice of life attendant upon the prosecution of these researches stands forever as a beacon in the correction

* Scott, 'National Antarctic Expedition,' 1900–4, vol. 1, p. 94.
† 'Scott's Last Expedition,' vol. 2, p. 294.
‡ *Ibid.*, p. 286.
§ *Ibid.*, p. 288. See also photograph following, pp. 286, 292.
‖ Slight fluctuations in the retreat of the small residual glaciers in temperate latitudes are noted in the reports of the Commission on Glaciers of the International Geological Congress by Professor Harry Fielding Reid. But the great measures of the progressiveness of glacial retreat are in the past disappearance of the Pleistocene ice-fields of temperate latitudes and the present retreat in the Antarctic and Arctic regions.
¶ See also 'Compte Rendu du XI[ème] Congrès Géologique International,' p. 1102. Stockholm, 1910.

of the erroneous and widespread conception that the Earth is in a period of refrigeration, desiccation and decay; and establishes the conclusion that it is in the spring-time of a new climatic control during which the areas fitted for man's uses are being extended and the moss of polar wastes will be replaced by rye and wheat.

MARSDEN MANSON.

Mr. Carruther's Maps of Mongolia and Dzungaria.

I have lately found in vol. 41, No. 4 (April, 1913), of the *Geographical Journal* the article "Notes on the Maps illustrating the Exploration in Mongola and Dzungaria," by Mr. Douglas W. Carruthers. Speaking of the great map added to Prof. Sapoznikoff's book, 'The Mongolian Altai,' he says about the part of the map relating to the Syansk range, "I found great difficulty in working in the new map of Kemchik with the old Russian survey of 1887, and in joining up the headwaters of this river and its tributaries with the mapping of them as shown by Prof. Sapoznikoff in his volume 'The Mongolian Altai,' published in 1912. There may be large errors here which will be shown up by more detailed work in the future" (p. 348).

I must make some remarks, because I compiled this map and shared in the exploration of Mongolia by Prof. Sapoznikoff in 1908 and 1909. This part of the map was compiled on (1) my own route surveys, (2) the map of the 'Southern Frontier Regions of Asiatic Russia,' (3) P. N. Krilloff's map, and (4) the map added to W. A. Oshurkoff's book, 'An Account of a Journey in the Summer 1902 to the West Syansk and west part of the chain Tannu-ola' (Records of Krasnyarsk's sub-section of the East Siberian Section of the Imperial Russian Geographical Society, vol. 1, sect. 1, St. Petersburg, 1909). This book is unknown to Mr. Carruthers, as one can see in the "Bibliography" of his 'Unknown Mongolia,' pp. 635–639. In fact, Mr. Oshurkoff was in 1902 at the sources of Kemchik, Alash, Aksuk, and of others, and compiled his map on the basis of his surveys and of the map compiled by the Academician Shwarz. He remarks on pp. 28–72, "I thought this map was the best for that country, and better than the 'Old Russian Survey,' which was (and is) full of errors." This book was not mentioned by Mr. Sapoznikoff in his work because he did not know of its existence, and was not very much interested himself in the materials of which I had compiled the great map.

Mr. Carruthers has made use of some of my surveys, but others he has completely altered, though these, my own surveys, related to countries which he has not visited. "There may be large errors here," and Mr. Carruthers by his careless dealings with another person's maps has without doubt enlarged their number.

W. W. OBRUCHEFF.

11th April, 1914.
Moscow, Arbat, Kaloshin per. 4, lodg. 18.

I do not know why Prof. Obrucheff implies that my words "there may be large errors here," viz. in the Kemchik section of my map of the upper Yenisei basin, referred to *his* work. On the contrary, it was really a confession on my part that my work of compiling a general map of that region was full of difficulty and consequently imperfect. If Prof. Sapoznikoff did not know of the existence of the book and map quoted by Prof. Obrucheff, there is some excuse for my omission of them in the Bibliography at the end of my volumes.

Geography—necessarily international—would be aided by the publication of Russian achievements, instead of being hindered by the secrecy which usually surrounds their work. Does Prof. Obrucheff know of the map I refer to as "a new map of the Kemchik, which I came by in Siberia"? If he does, he will realize why I had considerable difficulty in making Sapoznikoff's representation of the upper portions of the Kemchik valley (which Prof. Obrucheff owns to being responsible for) work in with it.

It remains to be proved whether I have "completely altered" any of Prof. Obrucheff's surveys, except where, placing reliance on my own surveys, I naturally used them in preference to his.

DOUGLAS CARRUTHERS.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1913-1914.

Thirteenth Meeting, April 27, 1914.—Colonel Sir THOMAS H. HOLDICH, K.C.M.G., K.C.I.E., C.B., Vice-President, in the Chair.

ELECTIONS.—*Captain Basil Bell Bathurst (late The Sherwood Foresters and Derby Regt.); Charles Victor Buchan; Francis Cornwall Crawford; Captain A. W. Dix, R.N.R.; Ernest Hynes Ferris; Sydney H. Hollamby; J. Castell Hopkins; Hugh T. Ker, M.Inst.C.E.; John Hubert Roberts; John Henry Stanford; Mrs. Gustav Sachs; The Rev. Canon Thornton.*

The paper read was:—

"The Land of the Ibibios (Southern Nigeria)." By P. Amaury Talbot.

Fourteenth Meeting, May 11, 1914.—DOUGLAS W. FRESHFIELD, Esq., Vice-President, in the Chair.

ELECTIONS.—*Reginald H. Blake; Walter Bonn; Bertram Brotherton; Lieut. Gerald Burrard, R.F.A.; John T. Cooldige, jun.; Martin Walter Craig; G. L. Findlay, M.D.; Hubert Earle Girdlestone; Miss Dora Keen; William Ferdinand Kirton; Gustav Kohn; Deodoro Moegle; Captain George Frederick Thomas Oakes (Royal Engineers); Christopher Ogle, M.A.; J. H. Orpen; Captain B. H. S. Romilly (Scots Guards); Captain Charles Stuart Wilkie.*

The paper read was:—

"The Conditions and Prospects of the Panama Canal." By D. Vaughan Cornish.

Afternoon Meeting, May 21, 1914.—Colonel Sir DUNCAN A. JOHNSTON, K.C.M.G., C.B., in the Chair.

The paper read was:—

"The Gulf Stream." By Commander Campbell Hepworth, C.B.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are as a rule written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Col. = Colonies.
Com. = Commerce.
C.R. = Comptes Rendus.
E. = Erdkunde.
G. = Geography, Géographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
Jb. = Jahrbuch.
Jber. = Jahresbericht.
k.k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. (Mém.) = Memoirs, Mémoires.
Met. (mét.) = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. (Riv.) = Review, Revue, Rivista.
S. = Society, Société, Selskab.
Sc. = Science(s).
Sitzb. = Sitzungsbericht.
T. = Transactions.
Ts. = Tijdschrift, Tidskrift.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is $10 \times 6\frac{1}{2}$.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Alps—Glaciation. *Z. Deuts. Oesterr. Alpenv.* **44** (1913): 26–39. **Klebelsberg.**

Die eiszeitliche Vergletscherung der Alpen, unter besonderer Berücksichtigung der Ostalpen. Von R. v. Klebelsberg.

Alps—Morphology. *Vierteljahrs. Naturfors. Ges. Zürich* **58** (1913): 15–34. **Arbenz.**

Die Faltenbogen der Zentral- und Ostschweiz. Von P. Arbenz. *Maps.*

Alps, Eastern—Glaciers. **Finsterwalder and Lagally.**

Z. Gletscherkunde **7** (1913): 145–182.

Die Neuvermessung des Suldenferners 1906 und dessen Veränderungen in den letzten Jahrzehnten. Von Sebastian Finsterwalder und Max Lagally. *Maps, Illustrations, and Diagrams.*

Alps, Eastern—Morphology. *Z. Deuts. Oesterr. Alpenv.* **44** (1913): 1–25. **Ampferer.**

Das geologische Gerust der Lechtaler Alpen. Von Otto Ampferer. *Illustrations.*

Alps, Eastern—Morphology. **Trümpy.**

Vierteljahrs. Naturf. Ges. Zürich **58** (1913): 1–9.

Zur Tektonik der unteren ostalpinen Decken Graubündens. Vorläufige Mitteilungen von D. Trümpy. *Sketch-map and Sections.*

Alps, Eastern—Hydrology. *Z. Gletscherkunde* **7** (1913): 183–190. **Klebelsberg.**

Die Wasserführung des Suldenbaches. Von R. v. Klebelsberg.

Austria—Lower Austria—Ethnography. **Hamza.**

Z. Deuts. Oesterr. Alpenv. **44** (1913): 81–127.

Folkloristische Studien aus dem niederösterreichischen Wechselgebiete. Von Ernst Hamza. *Illustrations.*

Austria—Survey. *M. k.k. Militär.-G.I.* **32**, 1912 (1913): 53–118. **Müllner.**

Die Fortsetzung des Präzisionsnivellements und die Neuausgleichung der Schleifen IV. bis VII. des Nivellementnetzes im westlichen Teile der Monarchie. Von Adolf Müllner. *Sketch-maps.*

Austria—Tirol—Place-names. *Deutsche Erde* **12** (1913): 14–25, 46–50. **Rohmeder.**
Der Gebrauch deutscher Ortsnamen in Welschtirol und im den sprachlichen Grenzgebieten. Von Dr. Wilhelm Rohmeder.

Balkan peninsula—Boundaries. *B. American G.S.* **45** (1913): 819–830. **Joerg.**
The new boundaries of the Balkan States and their significance. By W. L. G. Joerg. *Sketch-map.*

Balkan peninsula—Boundaries. *Petermanns M.* **59** (1913): II. 343. **Langhans.**
Die neuen Grenzen der Königreiche Serbien und Bulgarien. Von P[aul] L[anghans]. *Map.*

Balkan peninsula—Cartography. **Haardt von Hartenthurn.**
M. k.k. Militär. G.I. **32**, 1912 (1913): 153–161.
Die Kartographie der Balkanhalbinsel im 20. Jahrhundert. Von Vincenz Haardt v. Hartenthurn.

Balkan peninsula—Railways. *Questions Diplomatiques* **36** (1913): 713–723. **Sauzède.**
Les voies ferrées transbalkaniques. Par Albert Sauzède. *Sketch-map.*

Belgium—Pays de Herve. *B.S.R.G. d'Anvers* **36–37** (1912–13): *passim.* **Bihot.**
Le pays de Herve. Etude de géographie humaine. Par Dr. Ch. Bihot. *Sketch-map and Illustrations.*

Central Europe—Moors. *Z. Gletscherkunde* **7** (1913): 334–340. **Brückner.**
Moorbildungen und postglaziale Klimaschwankungen am Nordsaum der Ostalpen. Von Ed. Brückner.

Europe—Climatology. *Ymer: Ts. Svenska S.G.* **33** (1913): 119–140. **Pettersson.**
Om klimatvariationer i Europa under historisk tid och deras orsaker. Af Otto Pettersson. *Sketch-maps and Diagrams.*

Europe—Inland navigation. **Hennig.**
Weltverkehr und Weltwirtschaft **3** (1913–14): 329–332.
Die beiden Wasserscheiden der europäischen Binnenschiffahrt. Von Dr. Rich. Hennig. *Map.*

France—Alps—Glaciation. **Blanchard.**
Recueil Travaux I.G. Alpine (Grenoble) **1** (1913): 443–454.
La crue glaciaire dans les Alpes de Savoie au XVII^e^ siècle. Par Raoul Blanchard.

France—Alps—Road. **Vaughan.**
Recueil Travaux I.G. Alpine (Grenoble) **1** (1913): 5–44.
Travaux Historiques et Géographiques sur l'Oisans. Étude géographique et historique sur la route du Lautaret. Par Mlle. D. M. Vaughan.

France—Dauphiné—Historical. **Blanchard.**
Recueil Travaux I.G. Alpine (Grenoble) **1** (1913): 295–298.
Note sur le commerce des céréales du Bas-Dauphiné dans le courant du XVIII^e^ siècle. Par M. M. Blanchard.

France—Drôme. *Recueil Travaux I.G. Alpine (Grenoble)* **1** (1913): 73–83. **Faucher.**
Le site de Valence. Par M. D. Faucher. *Sketch-maps.*

France—Drôme. **Faucher.**
Recueil Travaux I.G. Alpine (Grenoble) **1** (1913): 179–192.
Note sur les terrasses de la plaine de Valence. Par M. D. Faucher.

France—Geology. *C.R.A Sc. Paris* **157** (1913): 1483–1485. **Blayac.**
Relations des sables des Landes avec les terrasses de la Garonne. Par J. Blayac.

France—Grenoble. *Recueil Travaux I.G. Alpine (Grenoble)* **1** (1913): 91–178. **Roux.**
Grenoble. Le cours Berriat. Étude géographique d'une rue. Par Ch.-Anthelme Roux. *Sketch-maps, Sections, and Diagrams.*

France—Haute-Savoie—Geology. **Joukowsky and Favre.**
Mém. S. de Phys. et d'Hist. Nat. Genève **37** (1913.): 294–523.
Monographie géologique et paléontologique du Salève (Haute-Savoie, France). Par Etienne Joukowsky et Jules Favre. *Maps, Illustrations, and Sections.*

France—Hydrology. *La G., B.S.G. Paris* **28** (1913): 231–246. **Lévy-Salvador.**
Utilisation des forces hydrauliques du bassin de l'Isère d'après les documents publiés par le Service des grandes forces de la région des Alpes. Par Paul Lévy-Salvador. *Sketch-map and Diagrams.*

France—Isère. *Recueil Travaux I.G. Alpine (Grenoble)* **1** (1913): 205–294. **Marchal.**
La cluse de l'Isère. Par J. Marchal. *Illustrations, Sections, and Diagram.*

France—Languages. *Deutsche Erde* **12** (1913): 35–41. **Witte.**
Die deutsch-französische Sprachgrenze in Nordfrankreich. Von Dr. Hans Witte. *Map.*

France—Lyonnais—Morphology. **Faucher.**
Recueil Travaux I.G. Alpine (Grenoble) **1** (1913): 455–476.
Observations morphologiques dans la région Lyonnaise. Excursion inter-universitaire de 1913. Par M. D. Faucher.

France—Savoy—Stock-raising. **Arbos.**
Recueil Travaux I.G. Alpine (Grenoble) **1** (1913): 45–71.
L'Economie pastorale dans quelques vallées Savoyardes. Par Ph. Arbos.

France—Seismology. *Ann. de G.* **22** (1913): 300–309. **Uhry.**
Le tremblement de terre de Plombières-Remiremont (1682), contribution à l'histoire des phénomènes sismiques en France. Par Alfred Uhry.

France—Shipping. *B.S.G. Com. Paris* **35** (1913): 86–112. **Casimir-Périer.**
Brest-Transatlantique. Comment on pourrait assurer à la France la suprématie de l'Atlantique. Par Claude Casimir-Périer.

France—Somme valley. *B.S.G. Lille* **59** (1913): 324–338. **Dubois.**
La vallée de la Somme. Les "hortillonnages," les pêcheries, les tourbières. Par Pierre Dubois.

France—South-east. **Bénévent.**
Recueil Travaux I.G. Alpine (Grenoble) **1** (1913): 323–442.
La pluviosité de la France au Sud-Est. Par E. Bénévent. *Maps and Diagrams.*
See note in the Monthly Record, March, 1914, p. 336.

Germany—Bavaria. *M.G. Ges. München* **7** (1912): 565–582. **Jaeger.**
Das Berchtesgadener Land. Eine erdgeschichtliche Studie. Von Julius Jaeger. *Sketch-map.*

Germany—Bavaria. *Z. Gletscherkunde* **7** (1913): 74–118. **Penck.**
Die Glazialbildungen zwischen Tölz und Holzkirchen. Von Albrecht Penck. *Illustrations and Sections.*

Germany—Bavaria—Morphology. *M.G. Ges. München* **8**: (1913): 77–177. **Aigner.**
Das Murnauer Diluvium. Geographisch-geologische Untersuchungen auf dem Gebiete der oberbayerischen Glazialablagerungen in der Umgebung von Murnau —Weilheim—Starnberg. Von Dr. P. Damasus Aigner. *Map.*

Germany—Colonies—Surveys. **Plähn.**
Z. Vermessungswesen **42** (1913): 922–928, 936–943, 959–964.
Das koloniale Vermessungswesen. Von — Plähn.

Germany—Dresden. *M.V.E. Dresden* **2** (1913): 783–802. **Schumann.**
Die Lage von Dresden. Von Dr. Arthur Schumann.
On the development of Dresden in relation to its physical environment.

Germany—Hessen. *Notizbl. V.E. Darmstadt* **33** (1912): 103–151. **Beetz.**
Beiträge zur Tektonik und Stratigraphie des Lauterbacher Grabens. Von W. Beetz. *Maps and Sections.*

Germany—Hessen. *Z. Vermessungswesen* **42** (1913): 185–197, 209–220. **Heil.**
Die Topographische Landesaufnahme des Grossherzogtums Hessen. Von — Heil. *Sketch-map and Illustration.*

Germany—Pomerania. *XIII. Jb. G. Ges. Greifswald* 1911–12 (1913): 235–514. **Otto.**
Der Darss und Zingst. Ein Beitrag zur Entwicklungsgeschichte der vorpommerschen Küste. Von Dr. Theodor Otto. *Maps and Illustrations.*

Germany—Pomerania—Lakes. **Kunisch.**
XIII. Jb. G. Ges. Greifswald 1911–12 (1913): 149–233.
Der Gardersee und Gr. Dolgensee. Mit einem Anhang: Ein Beitrag zur Kenntnis des Lebasees. Von Dr. Erwin Kunisch. *Map, Diagrams, and Sections.*

Germany—Prussia—Survey. **Pfitzer.**
Z. Vermessungswesen **42** (1913): 1–7, 40–49, 57–70, 81–94, 113–128.
Zur Geschichte des Rheinisch-Westfälischen Katasters. Johann Jakob Vorlaender; ein Vorkämpfer des preussischen Vermessungswesens. Von A. Pfitzer. *Sketch-map and Illustrations.*

Germany—Saxony. *M.V.E. Dresden* **2** (1913): 749–782. **Beschorner.**
Die sächsische Landschaft im Wandel der geschichtlichen Jahrhunderte. Von Dr. Hans Beschorner.
On the geographical changes in the course of ages, chiefly due to man's agency.

Germany—Silesia. *M.G. Ges. München* **8** (1913): 199–293. **Hornig.**
Die Oberflächenformen des nördlichen Eulengebirges, als Beispiel der Einwirkung der nordischen Vereisung auf das mittelschlesische Gebirge. Von Dr. Gottfried H. Hornig. *Map and Sections.*

Iceland. *M. Ges. E. Leipzig* 1912 (1913): 61–80. **Spethmann.**
Meine beiden Forschungsreisen im östlichen Inner-Island: Studien an Vulkanen und Gletschern. Von Dr. Hans Spethmann. *Maps and Illustrations.*

Italy—Apulia—Hydrology. **Colamonico.**
B.R.S.G. Italiana V, **2** (1913): I. 364–380, 527–541.
Le acque sotterranee in Puglia. Dal prof. Carmelo Colamonico.

Italy—Capri. *XIII. Jb. G. Ges. Greifswald* 1911–12 (1913): 1–17. **Kranz.**
Hohe Strandlinien auf Capri. Von W. Kranz. *Sketch-map and Illustrations.*

Italy—Cartography. *La G., I.G. De Agostini* **1** (1913): 205–217. **Agostini.**
A proposito di una bella iniziativa del T.C.I. L'opera dell Istituto Geografico De Agostini nella costruzione, redazione ed esecuzione della Carta d'Italia del T. C. I. al 250,000. Da G. De Agostini.

Italy—Census. *La G., I.G. Agostini* **1** (1913): 231–250. **Magistris.**
Intorno ai risultati definitivi del V. censimento generale della popolazione del Regno d'Italia (10–11 giugno 1911). Da L.-F. de Magistris.

Italy, Central—Morphology. *B.R.S.G. Italiana* V. **2** (1913) I.: 176–184. **Almagià.**
Forme e fenomeni di erosione nei dintorni di Bagnorea. Dal prof. Roberto Almagià. *Illustrations.*

Italy—Forests and pastures. *B.S.G. Paris* **35** (1913): 625–642. **Descombes.**
Forêts et pâturages d'Italie. Par Paul Descombes. *Illustrations.*

Italy—Lombardy. *Mem. G., Riv. G. Italiana* **7** (1913): 245–362. **Toniolo.**
Studi sopra la distribuzione della popolazione. II.: Ricerche di antropogeografia nell' alta Valcamonica. Da Antonio Renato Toniolo. *Map and Illustrations.*

Italy—Lombardy—Cartography. **Baratta.**
B.R.S.G. Italiana V, **2** (1913): I. 514–526; II. 1025–1031.
Sopra un' antica carta del territorio bresciano. Dal prof. Mario Baratta. *Facsimile Maps.*

Italy—Palermo. **Siragusa.**
Rendiconti R.A. Lincei, Cl. Sc. Morali, etc., V. **22** (1913): 45–66.
Sulla topografia mediævale palermitana. Del prof. G. B. Siragusa.

Italy—Pantelleria. *J. Geology* **21** (1913): 653–670; **22** (1914): 16–27. **Washington.**
The volcanoes and rocks of Pantelleria. By Henry S. Washington. *Map, Sections, and Illustrations.*

Italy—Sicily—Etna. **Sieberg.**
Naturw. Wochenschrift **28** (1913): 497–504, 513–519, 529–536.
Bau und Bild des Aetna sowie seine Eruptionen der Jahre 1910 und 1911. Von August Sieberg. *Illustrations and Section.*

Italy—Tuscany. **Brian and Mancini.**
B.R.S.G. Italiana V. **2** (1913): I., 1032–1051, 1118–1150, 1277–1311.
Caverne e grotte delle Alpi Apuane. Dal dott. Alessandro Brian e Cesare Mancini. *Plans and Illustrations.*

Lake of Geneva—Plankton. *C.R.A. Sc. Paris* **157** (1913): 1466–1468. **Yung.**
De la distribution verticale du plankton dans le lac de Genève. Par Émile Yung.

Portugal—Phytogeography. *Le Globe, Mém. S.G. Genève* **52** (1913): 59–146. **Chodat.**
Voyage d'études géobotaniques au Portugal. Par Prof. Robert Chodat. *Illustrations.*

Pyrenees.—Railways. *Questions Diplomatiques* **36** (1913): 449–461. **Sauzède.**
Les Transpyrénéens et les relations franco-espagnoles. Par Albert Sauzède. *Sketch-map.*

Rhine basin—Deposits. **Wunstorf.**
Verhandl. Naturhist. V. preuss. Rheinlande **69** (1912): 293–340.
Ueber Löss und Schotterlehm im Niederrheinischen Tiefland. Von W. Wunstorf. *Sketch-map and Sections.*

Rumania. *B.S.G. Lille* **60** (1913): 209–215. **Berindei.**
Le nouveau territoire Roumain. Par M. C. A. Berindei. *Sketch-map.*

Spain—Balearic islands. **Praesent.**
XIII. Jb. G. Ges. Greifswald, 1911–12 (1913): 19–106.
Bau und Boden der Balearischen Inseln. Beiträge zur Landeskunde der Inselgruppe. *Sketch-map and Illustrations.*

Spain—Irrigation. *B.S.G. Com. Paris* **35** (1913): 69–85. **Contenson.**
L'Irrigation au sud des Pyrénées. Par Baron de Contenson.

Spain—Zamora. *Petermanns M.* **59** (1913): II., 306–312. **Halbfass.**
Der Castañedasee, der grösste Süsswassersee Spaniens, und seine Umgebung. Von Prof. Dr. Wilhelm Halbfass. *Map and Illustrations.*
See note in the February number; 1914, p. 200.

Sweden—Mining. *Ymer; Ts. Svenska S.G.* **33** (1913): 278–352. **Nelson.**
En bergslagsbygd. En historisk-geografisk öfverblick. Af Helgi Nelson. *Maps.*
On the rise and development of the mining district comprised within Örebro and Värmland (South Central Sweden).

Switzerland—Ticino basin. *Z. Gletscherkunde* **7** (1913): 128–135. **Lehmann.**
Die Uebertiefung des Tessingebietes. Von Otto Lehmann.

United Kingdom—Scotland—Geology. **Peach and others.**
Memoirs of the Geological Survey, Scotland. The geology of the Fannich mountains and the country around Upper Loch Maree and Strath Broom. (Explanation of Sheet 92.) By Dr. B. N. Peach and others. Edinburgh, 1913. Size 9½ × 6, pp. viii. and 128. *Sketch-maps. Sections, and Illustrations. Price* 2*s.* 6*d.*

United Kingdom—Water transport. **Dunwoody.**
Inland water transport. A paper read on Friday, September 12, 1913, before the Economic Section of the British Association. By R. B. Dunwoody. London, [1913]. Size 8½ × 5½, pp. 64. *Presented by the Author.*

ASIA.

Baluchistan. *M.G. Ges. München* **8** (1913): 40–48. **Zugmayer.**
Balutschistan. (Vorläufige Ergebnisse einer Reise im Jahre 1911.) Von Dr. Erich Zugmayer. *Sketch-map and Illustrations.*
See note on this journey in vol. **38**, p. 430.

China—Historical. *T'oung Pao* **14** (1913): 473–476. **Rockhill.**
Notes on the relations and trade of China with the Eastern Archipelago and the coasts of the Indian Ocean during the fourteenth century. By the Hon. W. W. Rockhill.

China—Kiao-chou. *Kol. Monatsblätter* **15** (1913): 465–487. **Bökemann.**
Die Stadtanlage von Tsingtau. Von Bökemann. *Map, Plan, and Illustrations.*

China—Mongolia. *B.S. Belge d'études Coloniales* **20** (1913): 823–836. **De Wilde.**
Les voies de communication dans la Mongolie intérieure. Par le R. P. Benoni De Wilde. *Sketch-map.*

China and Mongolia. **Verbrugge.**
B.S. Belge d'Études Col. **20** (1913): 1–51, 120–135, 176–216.
Les confins sino-mongols. Géographie et ethnographie. Par le R. P. le Dr. R. Verbrugge. *Map, Diagram, and Illustrations.*

India—Himalaya—Glaciers. *Z. Gletscherkunde* **8** (1913): 65–103. **Workman.**
Features of Karakoram glaciers connected with pressure, especially of affluents. By Dr. W. H. Workman. *Illustrations.*

Malay Archipelago—Borneo. **Moulton.**
A collecting expedition to Mount Kinabalu, British North Borneo. By Dr. J. C. Moulton. (From the *Sarawak Gazette*, November, 1913.) Sarawak, 1913. Size 3 × 5½, pp. 22.
See note in the Monthly Record, April, 1914, p. 441.

Persia. *M.G. Ges. München* **8** (1913): 32–40, 177–188. **Niedermayer and Diez.**
Die Persien-Expedition O. Niedermayers.
Expedition in Northern Persia, primarily for geographical and geological work, but embracing also researches in natural history, meteorology, and antiquities. Lieut. Niedermayer was accompanied by Dr. Diez.

Philippines—Agriculture. **Saleeby.**
The Kapok industry. By Murad M. Saleeby. (Philippine Department of Instruction, Bureau of Agriculture, B. No. 26.) Manila, 1913. Size 9 × 6, pp. 42. *Illustrations and Diagrams.*
The Kapok (one of the *Bombaceæ*, or cotton-trees) produces in its pods a floss which is extensively used for filling pillows, etc.

Philippines—Ethnology. **Cole.**
Field Columbian Museum, Anthropological Ser. **12** (1913): pp. vii. and 204.
The wild tribes of Davas District, Mindanao. By Fay Cooper Cole. *Map and Illustrations.*

Philippines—Ethnology. *Nat. Geog. Mag.* **24** (1913): 1157–1256. **Worcester.**
The non-Christian peoples of the Philippine Islands. By Dean C. Worcester. *Illustrations.*

Russian Turkestan—Dunes. *Deuts. Kolonialblatt* **24** (1913); 868–880. **Buffe.**
Ueber des Festlegung von Wanderdünen in Buchara und Transkaspien. Von Dr. W. Buffe. *Illustrations.*

Turkey—Arabia—Yemen. *La G., B.S.G. Paris* **28** (1913): 201–219. **Beneyton.**
Mission d'études au Yemen. Par A. Beneyton. *Map, Diagrams, and Sections.*
See abstract and map in the January number, p. 66.

Turkey—Armenia and Kurdistan. *Petermanns M.* **59** (1913): 297–300. **Westarp.**
Routenaufnahmen in Armenien und Kurdistan. Von Graf. v. Westarp. *Map.*

Turkey—Asia Minor. *Die Erde* **1** (1913): 465–468. **Kossmann.**
Die Bardâdbahn im Taurus. Von W. Kossmann. *Illustrations.*

Turkey—Asia Minor—Chio. *B.R.S.G. Italiana*, V, **2** (1913): 1151–1172. **Barbarich.**
Cenni monografici sull' isola di Chio. Dal cap. E. Barbarich.

Turkey—Travel hints. **Grothe.**
Deuts. G. Blätter, G. Ges. Bremen **35** (1912): 81–97; **36** (1913): 90–113.
Wie man in der asiatischen Turkei reist. Praktische Winke und Rathschläge für den Forschungsreisenden. Von Dr. Hugo Grothe.

AFRICA.

Africa—Colonization. *G.Z.* **19** (1913): 554–565, 612–624. **Dove.**
Afrika und die Europäer. Von Karl Dove.

Africa—Disease. *P. Zoological S.* (1913): 321–337. **Yorke and others.**
The Relationship of the Big Game of Africa to the spread of Sleeping Sickness. By Dr. W. Yorke. With an appendix containing remarks by Sir John Bland-Sutton and others.

Algeria. *B.S.G. Alger* **18** (1913): 1–38. **Lafaye.**
Le pays des Haouara. Par Lieut. Lafaye. *Sketch-map.*

Algeria—Hydrology. ———
Gouvernement-général de l'Algérie. Direction des travaux publics et des mines. Tableau des jaugeages effectués en Algérie de 1901 à 1910. Algiers, 1913. Size 9½ × 6½, pp. vi. and 710.

Algeria—Tiaret. *B.S.G. d'Alger* **17** (1913): 287–348, 487–568. **Barlette.**
Monographie de la région de Tiaret. Par Henri Barlette.

Belgian Congo—Navigation. *Mouvement G.* **31** (1914): 19–24. ———
Les transatlantiques dans le Bas Congo. *Sketch-map.*

British South Africa—Coal. *Kol. Monatsblätter* **15** (1913): 570–572. **Kleinkemm.**
Die wirtschaftliche und verkehrsgeographische Bedeutung der südafrikanischen Kohle. Von Dr. R. Kleinkemm.

Central Africa—Tanganyika. *Kol. Monatsblätter* **15** (1913): 187–498. **Karstedt.**
Gegenwärtiges und Zukünftiges vom Tanganyikasee. Von Dr. F. D. Karstedt. *Sketch-map.*

French Equatorial Africa—Ba Kalè. **Avelot.**
Notice historique sur les Ba-Kalè. Par R. Avelot. (From *L'Anthropologie*, Tome 24, 1913.) Paris, 1913. Size 10 × 6½, pp. 197–240.

French Equatorial Africa—Dar-Banda. **Gillier.**
Renseignements Col., Afrique Française (1913): 346–355, 386–396.
Les Bandas, Notes ethnographiques. Par Lieutenant Gillier. *Sketch-maps.*

French West Africa. **Delafosse.**
Renseignements Col., Afrique Française (1913): 293–306, 325–329, 355–368.
Traditions historiques et légendaires du Soudan occidental. Par Maurice Delafosse.

German East Africa—Communications. *Kol. Monatsblätter* **16** (1914): 6–21. **Meyer.**
Der Kagerafluss in Ostafrika und die Ruandabahn. Von Prof. Dr. Hans Meyer.

German South-West Africa—Boundary. ———
M. Deuts. Schutzgeb. **25** (1912): 330–331.
Zur Karte des "Deutsch-portugiesischen Grenzgebiets in Südwestafrika." *Map.*

Gold Coast—Historical. *Kol. Monatsblätter* **15** (1913): 289–296, 355–362. **Voigt.**
Neue Forschungen über Gross-Friedrichsburg. Von Christoph Voigt. *Illustrations.*

Italian Colonies—Cartography. *Cosmos* **13** (1913): 206–220. **Cora.**
Cartografia coloniale dell Istituto Geografico Militare. Di Guido Cora. *Map.*

Kamerun. *Deuts. Kolonialblatt* **24** (1913): 626–629. **Houy.**
Von der Logone-Pama-Grenzexpedition (Bericht des Dr. Houy).

Kamerun. *M. Deuts. Schutzgeb.* **25** (1912): 1–18. **Strümpell.**
Forschungen am Nordrande des Kamerunplateaus. Von Hauptmann Kurt Strümpell. *Map and Illustrations.*

Kamerun—Boundary. *M. Deuts. Schutzgeb.* **26** (1913): 317–338. **Detzner.**
Die nigerische Grenze von Kamerun zwischen Yola und dem Cross-Fluss. Von Oberleut. Hermann Detzner. *Maps, Profile, and Illustration.*

Kamerun—Phytogeography. *M. Deuts. Schutzgeb.* **25** (1912): 20–55. **Ledermann.**
Eine botanische Wanderung nach Deutsch-Adamaua. Von C. Ledermann. *Map.*

Kamerun—Waterways. *Deuts. Kolonialblatt* **24** (1913): 623–626. **[Michell.]**
Die Kamerun Schiffahrts-Expedition. *Illustrations.*
See note in vol. **42**, p. 493. The leader (whose name does not appear) is F. Michell.

Nigeria. **Mercadier.**
L'Armée noire Anglaise en Afrique occidentale. Notes sur la West African Frontier Force. Par Lieut. Maurice Mercadier. Paris, 1913. Size 9 × 6, pp. 52. *Map and Illustration. Presented by the Author.*

Nigeria and Kamerun—Boundary. ———
Treaty Series, 1913, No. 13. Agreement between the United Kingdom and Germany respecting: (1) the settlement of the frontier between Nigeria and the Cameroons, from Yola to the sea; and (2) the regulation of navigation on the Cross river. London, 1913. Size 9½ × 6½, pp. 231–242. *Maps. Price* 1*s.* 7*d.*
Describes the course of the boundary in detail, with reference to the boundary pillars set up.

South Africa—Irrigation. *Agricultural J., Union South Africa* **5** (1913): 219–234. **Carlson.**

Forestry in relation to irrigation in South Africa. A practical proposition. By K. A. Carlson. *Illustrations.*

Tripoli—Archæology. *B.R.S.G. Italiana*, V, **2** (1918): II. 997–1024. **Aurigemma**

Campagne libiche della Missione Archeologica Italiana. Dal dott. Salvatore Aurigemma. *Illustrations.*

Tripoli—Geology. *B.R.S.G. Italiana*, V, **2** (1913): II. 921–952. **Sanfilippo.**

La missione mineralogica italiana nella Tripolitania. Dal cav. Ignazio Sanfilippo. *Illustrations.*

West Africa—Buffaloes. *P. Zoological S.* (1913): 234–241. **Lydekker.**

The Dwarf Buffaloes of Southern Nigeria; with a revision of the Dwarf Buffaloes of Western Africa. By R. Lydekker. *Illustrations.*

West Africa—Cartography. *M. Deuts. Schutzgeb.* **26** (1913): 339–340. **Moisel.**

Begleitworte zu der Höhenschichtenkarte von Kamerun mit Togo in 1 : 2,000,000. Von M. Moisel. *Map.*

NORTH AMERICA.

Alaska—Glaciers. *B. American G.S.* **45** (1913): 801–818. **Martin.**

Alaskan glaciers in relation to life. By Lawrence Martin. *Sketch-maps and Illustrations.*

Alaska—Glaciers. *Z. Gletscherkunde* **7** (1913): 289–333. **Martin.**

Some features of glaciers and glaciation in the College Fiord, Prince William Sound, Alaska. By Lawrence Martin. *Sketch-maps, Illustrations, and Sections.*

Alaska—Mount McKinley. **Stuck.**

The ascent of Denali (Mount McKinley). By [Archd.] Hudson Stuck. From *Scribner's Magazine*, vol. **54**, November, 1913.) London, 1913. Size 9½ × 6½, pp. 531–552. *Illustrations.*

See note in the January number, 1914, p. 83.

Canada. **Dept. Naval Service.**

Report of the Department of the Naval Service for the fiscal year ending March 31, 1913. Ottawa, 1913. Size 10 × 6½, pp. 128. *Maps and Illustrations.*

Includes reports on surveys in Hudson bay and strait (see note in the March number, 1914, p. 339).

Canada—Hudson bay. **Tyrrell.**

Hudson Bay Exploring Expedition, 1912. By J. B. Tyrrell. (Reprinted from the 22nd Report of the Ontario Bureau of Mines, 1913.) Toronto, 1913. Size 9½ × 6½, pp. 52. *Maps and Illustrations.*

See note in the Monthly Record, April, 1914, p. 444.

United States—Pennsylvania. *J. Geology* **21** (1913): 557–563. **Darton.**

Buried valley of Susquehanna River in Luzerne County, Pennsylvania. By N. H. Darton. *Sketch-map.*

United States—Virginia. *Z. Ges. E. Berlin* (1913): 695–712. **Rühl.**

Der Hafen von Newport News: ein amerikanischer Verkehrsproblem. Von Alfred Rühl. *Diagrams.*

CENTRAL AND SOUTH AMERICA.

Argentine. *Ann. de G.* **22** (1913): 337–352. **Denis.**

La Sierra de la Lumbrera. (République Argentine.) Par Pierre Denis. *Sketch-map.*

Argentine—Agriculture. *B.R.S.G. Italiana V*, **2** (1913): I. 125–157. **Gribaudi.**

I progressi dell' agricoltura argentina. Del prof. Piero Gribaudi.

Bolivia—Language. **Créqui-Montfort and Rivet.**

Linguistique Bolivienne. La langue Kaničana. Par G. de Créqui-Montfort et P. Rivet. (Extrait des Mémoires de la Société de Linguistique de Paris. Tome xviii.) Paris, 1913. Size 10 × 6½, pp. 24.

Brazil. *Z. Ges. E. Berlin* (1913): 665–694. **Koch-Grünberg.**
Meine Reise durch Nord-Brasilien zum Orinoco 1911–1913. Von Prof. Dr. Th. Koch-Grünberg.
See notes on this expedition in vols. **39**, p. 401; **42**, p. 79.

Brazil—Historical. *B.S.G. Com. Paris* **35** (1913): 462–482. **Duchemin.**
Un grand effort colonial français oublié. Par Eugène Duchemin.
On French attempts at colonization in Maranham, 1594–1615.

Panama—Earthquakes. **MacDonald and Johnston.**
Isthmian earthquakes. Commission appointed by President Porras gives history and probable origin of recent shocks. [The commission consisted of Donald F. MacDonald and William Caley Johnston.] (From the *Canal Record*, December 10, 1913). Ancon, 1913. Size 12 × 9, pp. 144–149. *Sketch-maps.*

Panama Canal. *La G., B.S.G. Paris* **28** (1913): 220–230. **Clerget.**
Le canal de Panama. Par Pierre Clerget.

Paraguay. *M.G. Ges. München* **8** (1913): 16–32. **Carnier.**
Skizzen vom paraguayischen Chaco und von der englischen Mission unter den Lengua-Indianern. Von Dr. Karl Carnier. *Illustrations.*

Paraguay—Relief. *M.G. Ges. München* **8** (1913): 7–16. **Carnier.**
Einige Bemerkungen über die isolierten Gebirge im Tiefland des Paraguay. Von Dr. Karl Carnier.
See note in vol. **42**, p. 573.

South America—Geology. *M.G. Ges. München* **8** (1913): 293–301. **Goldschlag.**
Zur Petrographie Paraguays und Matto Grossos. Von Dr. M. Goldschlag.

AUSTRALIA AND PACIFIC ISLANDS.

Australia—Northern Territory—Ethnology. **Spencer.**
B. Northern Territory, No. 7 (1913): pp. 28.
Preliminary report on the aboriginals of the Northern Territory. By Prof. W. Baldwin Spencer. *Sketch-maps and Illustrations.*

Bismarck Archipelago. **Ribbe.**
M.V.E. Dresden **2** (1912): 75–150, 163–222, 273–384, 391–494.
Ein Sammelaufenthalt in Neu-Lauenburg. Von C. Ribbe. *Map and Illustrations.*

New Caledonia. *Le Globe, Mém. S.G. Genève* **52** (1913): 1–23. **Sarasin.**
Voyage en Nouvelle-Calédonie. Par Dr. Fritz Sarasin.

New Guinea—Boundary. *M. Deuts. Schutzgeb.* **25** (1912): 72–74. ——
Bericht über die Arbeiten des Hauptmanns Foerster bei Gelegenheit der Grenzfestsetzung von Kaiser-Wilhelmsland in Verlauf des 8. Grades südlicher Breite. *Map.*
On the work for the demarcation of the Anglo-German boundary at its eastern end.

New Guinea, German. *M. Deuts. Schutzgeb.* **26** (1913): 357–361. **Thurnwald.**
Eine Durchquerung des Gebiets zwischen Kaiserin-Augustafluss und Küste. Vorläufiger Bericht von Dr. R. Thurnwald. *Sketch-map.*
Journey by one of the members of the Kaiserin-Augusta river expedition.

New Guinea, German—Admiralty Islands. **Cohn.**
Petermanns M. **59** (1913): II. 315–320.
Beobachtungen von den Admiralitätsinseln. Von Dr. Ludwig Cohn. *Map.*

New Zealand—Survey. **Department of Lands.**
New Zealand. Department of Lands and Survey. Report on the Survey Operations for the year 1912–13. By James MacKenzie. Wellington, 1913. Size 13 × 8, pp. 78. *Maps, Diagrams, and Illustrations.*

Tahiti—Papeete. *B. Comité l'Océanie Française* (1913): 319–324. ——
Papeete. Port d'escale et Dépôt de charbon. Par G. H. *Sketch-map.*

POLAR REGIONS.

Antarctic—Bibliography. **Denucé.**

Bibliographie Antarctique. Par J. Denucé. (In 'Commission Polaire Internationale. Procès-Verval de la session tenue à Rome en 1913.') Brussels, 1913. Size 9½ × 6, pp. 29–294.

A systematically arranged bibliography of literature on the Antarctic, probably the most complete that has yet appeared. It includes over 3000 items.

Arctic—Climatology. *Met. Z.* **30** (1913): 369–380. **Porsild.**

Zur Kenntnis des photochemischen Klimas der Arktis. Von Morten P. Porsild. *Diagrams.*

Greenland—Bibliography. **Kornerup.**

Oversigt over Meddelelser om Grönland 1876–1912, udgivne af Kommissionen for Ledelsen af de geologiske og geografiske Undersögelser i Grönland. Udarbejdet af Thorvald Kornerup. Copenhagen, 1913. Size 11 × 7, pp. 107.

Greenland—Ethnology. **Thalbitzer.**

Meddelelser om Grönland **39** (1914): pp. xx. and 756.

The Ammassalik Eskimo. Contributions to the ethnology of the East Greenland natives. Part I. Edited by William Thalbitzer. *Map and Illustrations.*

Greenland—Historical. **Borchgrave.**

Internat. Congress Americanists, P. XVIII. Session, 1912 (1913): p. 433.

La Flandre et le Groenland au IX^e^ siècle. Par le Baron de Borchgrave.

Polar Commission. **Lecointe.**

Commission Polaire Internationale. Procès-Verbal de la session tenue à Rome en 1913. Par G. Lecointe. Brussels, 1913. Size 9½ × 6, pp. 294.

South Georgia—Geology. *Geol. Mag.* VI. **1** (1914): 53–59. **Ferguson.**

The geology of South Georgia. By D. Furguson.

South Georgia—Geology. *Geol. Mag.* VI. **1** (1914): 61–64. **Gregory.**

The geological relations of South Georgia. By Dr. J. W. Gregory.

Spitsbergen—Meteorology. *Met. Z.* **30** (1913): 594–599. **Robitzsch.**

Sonnenscheinregistrierungen auf Spitzbergen. Von Dr. Max Robitzsch. *Diagrams.*

Spitsbergen—Sea-water. *Ymer; Ts. Svenska S.G.* **33** (1913): 148–157. **Geer.**

Hafsvattnets slamhalt inom Spetsbergens Isfjord ur geografisk synpunkt. Af Sten De Geer. *Sketch-map and Illustrations.*

MATHEMATICAL GEOGRAPHY.

Cartography. *B.R.S.G. Italiana,* V, **2** (1913): I. 266–277. **Roncagli.**

Per la cartografia aeronautica. Nota del com. Giovanni Roncagli.

Cartography—International Map. **Haardt von Hartenthurm.**

Petermanns M. **59** (1913): II. 300–303.

Die Internationale Erdkarte in 1:1 Million. Von Vincenz Haardt von Hartenthurm.

Cartography—Projection. *Ann. Hydrographie* **41** (1913): 466–473. **Schoy.**

Die gegenazimutale mittabstandtreue Karte in konstruktiver und theoretischer Behandlung. Von Dr. C. Schoy. *Diagrams.*

Cartography—Projections. *Petermanns M.* **59** (1913): II. 241–245, 304–306. **Winkel.**

Beitrag zur Entwicklung schiefachsiger, speziell zylindrischer Projektionen unter Annahme der Kugelgestalt der Erde. Von Oswald Winkel. *Maps.*

Measures—Nautical mile. **Wagner.**

Ann. Hydrographie **41** (1913): 393–413, 441–450.

Zur Geschichte der Seemeile. Von Prof. Dr. Hermann Wagner. *Also separate copy* (size 10½ × 7½).

Survey. *M. k.k. Militär-G. I.* **32** 1912 (1913): 119–152. **Korzer.**

Altes und Neues von der Landesaufnahme. Von Karl Korzer.

Survey—Instrument. *M.G. Ges. München* **8** (1913): 1–7. **Schück.**

Zur Entwicklung des "Jakobsstabes." Von A. Schück. *Illustration.*

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Age of the Earth. *J.G.* **12** (1913): 70–74. **Davis.**

The age of the Earth. By W. M. Davis.

Climatology. *M.V.E. Dresden* **2** (1913): 745–748. **Mahler.**

Klimaprofile. Von Dr. Karl Mahler. *Diagrams.*

Climatology. *Naturw. Wochenschrift* **28** (1913): 567–575. **Merz.**

Land- und Seeklima. (Nach Alfred Merz.)

Climatology. *Quart. J. R. Met. Sc.* **4** (1914): 53–70. **Brooks.**

The meteorological conditions of an ice-sheet and their bearing on the desiccation of the Globe. By Charles E. P. Brooks.

See Monthly Record, *ante.*

Climatology. *Annuaire Géol., Russie* **15** (1913): 75–81. **Chirvinsky.**

Die Verschiebung der Pole als Hauptursache der Klimatischen Veränderung während der Tertiar- und Quartärperioden und die wichtigsten Ursachen dieser Verschiebung. Von Prof. P. N. Tschirwinsky. [In Russian; German *résumé.*]

Climatology—Pressure-Distribution. *Met. Z.* **29** (1912): 501–511. **Köppen.**

Die geographische Verbreitung der monatlichen Barometerschwankungen. Von W. Köppen. *Maps and Diagrams.*

Earth-history. *J. Geology* **21** (1913): 517–533. **Chamberlin.**

Diastrophism and the formative processes. I. Introduction. II. Shelf-seas and certain limitations of diastrophism. By T. C. Chamberlin.

The writer favours the idea of an elastico-rigid, largely crystalline, Earth-body, and, in the second paper, doubts some of the traditional views regarding the processes of crust-deformation.

Earth-history. *Sitzb. K.A.W. Wien*, Abt. IIa. **121** (1912): 1825–1873. **Spitaler.**

Die Eiszeiten und Polschwankungen der Erde. Von Prof. Dr. Rudolf Spitaler. *Diagrams.*

Forests. *M. Ges. E. Strassburg* **3**, 1912 (1913): 1–81. **Schmid.**

Die geographische und wirtschaftliche Bedeutung des Waldes und seine Rückwirkung auf die Volksdichte unter besonderer Berücksichtigung der Verhältnisse im Oberelsass. Von Dr. Friedrich Schmid. *Maps.*

Forests and Water-supply. **Zon.**

Forests and water in the light of scientific investigation. By Raphael Zon. (Appendix V. to the Final Report of the National Waterways Commission.) (Washington), N.D. Size 9 × 6, pp. 205–302.

Geology—Hints. **Grabham and Dunn.**

Hints on collecting geological information and specimens. By G. W. Grabham and Stanley C. Dunn. Khartoum and Edinburgh, 1913. Size 9 × 6, pp. 24.

Geomorphology. *M.V.E. Dresden* **2** (1913): 717–744. **Arldt.**

Der mittelmeerische Gürtel und seine erdgeschichtliche Bedeutung. Von Dr. Th. Arldt. *Map.*

Geomorphology. *Z. Gletscherkunde* **7** (1913): 119–127. **Bowman.**

Asymetrical crest lines and abnormal valley profiles in the Central Andes. By Isaiah Bowman. *Illustrations and Sections.*

Geomorphology—Coast-lines. *J. Geology* **21** (1913): 537–540. **Clapp.**

Contraposed shore-lines. By Charles Clapp. *Sketch-map and Illustrations.*

The somewhat clumsy term "contraposed" is coined by the author to denote shore-lines worn back into hard rocks by the removal of a soft mantle.

Geomorphology—Erosion. **Evans.**

The wearing down of the rocks. By Dr. J. W. Evans. (Reprinted from *Proc. Geologists' Assoc.*, vol. **24.**) [London, 1913.] Size 8½ × 5½, pp. 241–300.

Geomorphology—Floating islands. *B.G.S. Philadelphia* **12** (1914): 1–26. **Powers.**

Floating islands. By Sidney Powers. *Illustrations.*

See note in the Monthly Record, May, p. 582.

Geomorphology—Landslides. *Riv. G. Italiana* **20** (1913): 330–341, 479–495. **Trabucco.**

Sulla classificazione e sull' origine delle frane. Di Giacomo Trabucco.

Geomorphology—Mountains. *J. Geology* **22** (1914): 71–90. **Hobbs.**
Mechanics of formation of arcuate mountains. By William H. Hobbs. *Sketch-maps, Illustrations, and Sections.*

Geomorphology—Valleys. *B.R.S. G. Italiana* **3** (1914): 78–80. **Azzi.**
Valli consequenti e subsequenti. Dott. G. Azzi. *Diagrams.*

Geomorphology—Weathering. *Notizbl. V.E. Darmstadt* **33** (1912): 17–23. **Klemm.**
Ueber einige auffällige Verwitterungsformen von Gesteinen des kristallinen Odenwaldes. Von G. Klemm. *Illustrations.*

Geophysics. *Beiträge Geophysik* **12** (1913): 588–638. **Hübner.**
Beitrag zur Theorie der isostätischen Reduktion der Schwerebeschleunigung. Von Erich Hübner. *Diagrams.*

Glacial Epoch—Snow-line. *Z. Gletscherkunde* **8** (1913): 104–128. **Machachek.**
Die Depression der eiszeitlichen Schneegrenze. Von Dr. Fritz Machatschek.

Glaciers. **Rabot and Mercanton.**
Commission Internationale des Glaciers. Les variations périodiques des glaciers. XVIII^me^ Rapport, 1912. Rédigé par Charles Rabot et P. L. Mercanton. (From *Annales de Glaciologie*, t. 8, 1913.) Berlin, 1913. Size 9½ × 7, pp. 42–62.

Glaciology. *G. Teacher* **7** (1913): 73–89. **Garwood.**
Arctic glaciers and British ice-sheets. By Prof. Edmund J. Garwood. *Sketch-map and Illustrations.*

Gravity—Torsion balance. *Z. Vermessungswesen* **42** (1913): 474–483, 505–517. **Eggert.**
Theorie und Anwendung der Drehwage von Eötvös. Von Eggert. *Diagrams.*

Hydrology. *Beiträge Geophysik* **13** (1913): Kl. M., 10–20. **Halbfass.**
Neuere Ansichten über das Grundwasser. Von Prof. Dr. W. Halbfass.

Hydrology—Rivers. *G. Anzeiger* **13** (1912); 266–270. **Henkel.**
Zusammenstellung von Zahlen für die Wasserführung der Flüsse. Von Prof. Dr. L. Henkel.
An attempt to bring together trustworthy data as to the volumes of rivers.

Icebergs. *Naturw. Wochenschrift* **28** (1913): 616–620. **Baschin.**
Eisberge und Schiffahrt. Von Otto Baschin.

Limnology—Apparatus. *Internat. Rev. Hydrobiologie* **6** (1913): 53–62. **Ruttner.**
Ueber einige bei der Untersuchung des Lunzer Seen verwendete Apparate und Gerätschaften. Von Dr. F. Ruttner. *Illustrations.*

Limnology—Fauna. *Internat. Rev. Hydrobiologie* **6** (1913): 243–249. **Thienemann.**
Der Zusammenhang zwischen dem Sauerstoffgehalt des Tiefengewassers und der Zusammensetzung der Tiefenfauna unserer Seen. Vorläufige Mitteilung. Von August Thienemann.

Limnology—Temperatures. *Petermanns M.* **59** (1913): II. 312. **Halbfass.**
Einfluss der geographischen Lage auf die Wärmeverhältnisse von Seen. Von W. Halbfass.

Ocean basins. *Petermanns M.* **59** (1913): II. 322–323. **Putsche.**
Kritischer Böschungswinkel und Kritische Tiefe. Von Paul Putsche. *Diagrams.*

Oceanography—Atlantic. *Internat. Rev. Hydrobiologie* **6** (1913): 1–6. **Pettersson.**
Der Atlantische Ozean während der Eiszeit. Eine Besprechung der neuesten Arbeiten von Sir J. Murray und G. Hull. Von O. Pettersson. *Maps and Diagrams.*

Oceanography—Fauna. *Internat. Rev. Hydrobiologie* **6** (1913): 17–30, 134–146. **Clark.**
On the deep-sea and comparable faunas. By Austin H. Clark.

Oceanography—North Atlantic. **Nansen.**
The waters of the North-Eastern North Atlantic. Investigations made during the cruise of the *Frithjof*, of the Norwegian Royal Navy, in July, 1910. By (Dr.) Fridtjof Nansen. (From the *Internationale Revue der gesamten Hydrobiologie und Hydrographie*, 1913.) Leipzig, 1913. Size 9½ × 6½, pp. 140. *Charts and Diagrams.*

River-beds. *Recueil Travaux I.G. Alpine (Grenoble)* **1** (1913): 193–200. **Blache.**
Note sur l'évolution du lit des cours d'eau. Par M. J. Blache. *Sections*

Seismology. *Beiträge Geophysik* **12** (1913): 485–527. **Davison.**
The sound-phenomena of British earthquakes. By Dr. Charles Davison. *Sketch-maps.*

Seismology. *Beiträge Geophysik* **13** (1913): 28–63. **Rosenthal.**
Ueber die Tiefenbestimmung von Erdbebenherden. Von Elmar Rosenthal. *Diagrams.*

Volcanoes. *Sitzb. K.A.W. München, math.-phys. Kl.* 1913: 39–54. **Günther.**
Die geschichtlich erste grundsätzliche Unterscheidung zwischen Schichtvulkanen und Quellkuppen. Von Seigmund Günther.

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Anthropogeography. *B.R.S.G. Italiana* V, **2** (1913): II. 1097–1117. **Biéler-Chatelan.**
La formazione dei deserti e le emigrazioni umane. Da Th. Biéler-Chatelan.

Anthropogeography—Transhumance. *B.S.G. d'Anvers* **36** (1913): 105–126. **Fritsché.**
La Transhumance: étude de géographie humaine. Par Emma Fritsché. *Diagrams.*
On periodic movements of flocks between pasture grounds.

Commercial—Ports. *Deuts. G. Blätter, G. Ges. Bremen* **36** (1913): 1–89. **Falkenstein.**
Die Typen der Verkehrslagen am Meer. Von Franz Falkenstein.

Commercial—Turquoise. **Laufer.**
Field Columbian Museum, Anthropological Ser. **13** (1913): pp. 72.
Notes on Turquois in the East. By Berthold Laufer. *Illustrations.*

Commercial Geography. **Michel and Knapp.**
Documents cartographiques de géographie économique. Publiés . . . par Gaston Michel et Charles Knapp. No. 1, 1913. Bern: Kümmerly & Frey, 1913. Size 15 × 9. [4 *Maps, with Text in French, German, and English.*]

Historical—Mercator. *B.S.G. d'Anvers* **36** (1913): 161–167–184. **Denucé.**
Le 400e anniversaire de la naissance de Gérard Mercator à la Société royale de Géographie d'Anvers. Conférence de M. Denucé. *Portrait.*

History of Geography. *B.R.S.G. Italiana* V, **2** (1913): 542–544. **Bertolini.**
Qualche chiarimento su *l'Orbis Pictus* di Papa Zaccaria. Dal prof. G. Lod. Bertolini. *Facsimile.*

History of Geography. *B.R.S.G. Italiana* V, **2** (1913): I. 95–124, 231–265. **Revelli.**
La geografia nel Cinquecento. Del prof. Paolo Revelli.

Place-names—Orthography. *Riv. G. Italiana* **20** (1913): 346–364. **Ricchieri.**
Rapporto della Commissione per la trascrizione dei nome geografiche al X. Congresso Internazionale di Geografia (Roma, 1913). Da Giuseppe Ricchieri. *Also separate copy* (size 9½ × 6½).

BIOGRAPHY.

Hantzsch. *M.V.E. Dresden* **2** (1913): 669–716. **Rosenmüller.**
Bernhard Hantzsch und seine letzte Forschungsreise in Baffinland. Vorläufige Bericht . . . von Dr. M. Rosenmüller. *Maps and Portrait.*
See note on this ill-fated explorer in vol. **41**, p. 171.

GENERAL.

Geography. *B.R.S.G. Italiana* V, **2** (1913): II. 895–920. **Bertacchi.**
La geografia nella scienza, nella scuola e nella vita sociale. Dal prof. Cosimo Bertacchi.

Geography. *B. American G.S.* **45** (1913): 641–652. **Huntington.**
The new science of Geography. By Ellsworth Huntington.

Geography. *Ann. de G.* **22** (1913): 289–299. **Vidal de la Blache.**
Des Caractères distinctifs de la géographie. Par P. Vidal de la Blache.

Mountains. *Recueil Travaux I.G. Alpine* **1** (1913): 85–90. **Blanchard.**
Questionnaire d'enquêtes géographiques en montagne. Par Raoul Blanchard.
Schedule of subjects for research in a mountainous district.

Regional Geography. **Herbertson.**

The higher units. By (Dr.) A. J. Herbertson. (From *Scientia*, vol. 14, 1913.) Bologna, [1913]. Size 9½ × 6½, pp. 199–212. *Sketch-map.*

Statistics. **Birot.**

Statistique Annuelle de géographie humaine comparée, 1913. Par Jean Birot. Paris: Hachette et Cie., 1913. Size 8½ × 5½, pp. 32.

NEW MAPS.

By E. A. REEVES, *Map Curator*, R.G.S.

EUROPE.

Austria. **Deutsch. u. Oesterreich. Alpen-Verein.**

Karte der Lechtaler-Alpen. Arlberg-Gebiet. Herausgegeben v. Deutschen und Oesterreichischen Alpen-Verein. Scale 1 : 25,000 or 2·5 inches to 1 stat. mile. Vienna: G. Freytag & Berndt, 1913. *Presented by the Publishers.*

This detailed map of the Aarlberg district, in the Lechtal Alps, in the Tyrol, is a continuation to the west of the map on the same scale noticed in the *Geographical Journal* for March, 1912. It is from the topographical survey of Herr L. Aegerter, based upon the Austrian Government triangulation, with special information supplied by Dr. Ampferer and others. The style of production bears a general resemblance to that of the Swiss Siegfried survey map, and contours are given at 20-metre intervals. In addition to the contours numerous "spot" heights are given, and rockwork is shown by vertical hachures. The map will be invaluable to mountaineers and others visiting the district, and is a most careful and creditable production. It is published in the Zeitschrift of the German and Austrian Alpine Club, Band xliv., 1913.

Austria. **Freytag.**

G. Freytags Skirouten-Karten. 1. Niederösterr.-steirische Kalkalpen, östlicher Teil (20 by 24 inches); 2. Niederösterr.-steirische Kalkalpen, westlicher Teil (16 by 20 inches); 3. Ennstal und Rottenmanner Tauern (16 by 20 inches); 4. Oestliches Salzkammergut (23 by 19 inches); 5. Berchtesgadnerland und Pinzgau (24 by 17 inches); 6. Grazer Bergland (18 by 22 inches); 7. Unteres Mürztal und Hochschwabgebiet (16 by 20 inches). Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. Vienna: G. Freytag & Berndt, [1913]. *Price* 1.20 *Kr. each sheet. Presented by the Publishers.*

Maps of various districts in the Eastern Alps, drawn for ski expeditions and travelling. The special routes and information are shown in red upon a topographical map, with brown contours at 100-metre intervals.

Austria—Bozen. **Freytag.**

G. Freytags Karte der Umgebung von Bozen. Massstab 1 : 150,000 (1 inch to 2·3 stat. miles). Mit den Stadtplänen von Bozen-Gries, Massstab 1 : 12,000 (5·3 inches to 1 stat. mile), und Meran, Ober- und Untermais, Massstab 1 : 12,000. Vienna: G. Freytag & Berndt, [1914]. *Price* 60 *Heller. Presented by the Publishers.*

Austria—Karlsbad. **Freytag and Berndt.**

Karte des Politischen- und Schulbezirkes Karlsbad. Herausgegeben von der Bezirksverteilung Karlsbad 1913. Scale 1 : 25,000 or 2·5 inches to 1 stat. mile. 4 sheets, each 23 by 21 inches. Vienna: G. Freytag & Berndt, 1913. *Presented by the Publishers.*

Austria—Sudetes. **Rothaug and Thoms.**

Wirtschaftskarte der österr. Sudetenlander. Bearbeitet von Prof. Joh. Georg Rothaug und Franz Thoms. Scale 1 : 300,000 or 1 inch to 4·7 stat. miles. 4 sheets, each 24 by 36 inches. Vienna: G. Freytag & Berndt, 1913. *Presented by the Publishers.*

Austria—Vienna. **Freytag.**

G. Freytags Verkehrsplan der k.k. Reichshaupt- und Residenzstadt Wien, 1914. Massstab 1 : 15,000 (4·2 inches to 1 stat. mile). Mit dem Plan des XXI. Bezirkes Floridsdorf. Vienna: G. Freytag & Berndt, 1914. *Price* 1.50 *Kr. Presented by the Publishers.*

Austria-Hungary. **Freytag.**

Neue Bahnprojekte in Oesterreich-Ungarn und den Balkanstaaten. Bearbeitet von G. Freytag. Scale 1 : 1,400,000 or 1 inch to 22·1 stat. miles. Size 29 by 38 inches. Vienna: G. Freytag & Berndt, 1914. *Price* 2 *Kr. Presented by the Publishers.*

An outline map, printed in colours, showing existing railways in red, and railways constructing or projected, in green. The character of the railway is distinguished by special symbols, and particulars are given in the text at the side of the map.

Austria-Hungary. **Freytag**

G. Freytags Eisenbahn-Wandkarte von Oesterreich.-Ungarn. Scale 1 : 750,000 or 1 inch to 11·8 stat. miles. 4 sheets, each 27 by 34 inches. Vienna: G. Freytag & Berndt, [1914]. *Presented by the Publishers.*

A large outline wall map printed in colours, showing, in red, railways of Austria-Hungary and adjacent countries, working, under construction, and proposed, with particulars of the various lines.

Austria-Hungary. **Freytag.**

G. Freytags Verkehrskarte von Oesterreich-Ungarn mit den Balkländern 1914. Scale 1 : 1,400,000 or 1 inch to 22·1 stat. miles. Vienna: G. Freytag & Berndt, 1914. *Price* 2.40 *Kr. Presented by the Publishers.*

Indicates by colour and symbols the various natural products and industries. It is a wall map evidently intended for class-room use, but is hardly clear enough for this purpose. The dark green used to show forests obliterates the other information to a considerable extent, and it would have been a decided advantage if this had been printed much lighter.

Balkan States. **Freytag.**

G. Freytags Karte der Balkan-Halbinsel. Mit den neuen politischen Grenzen. Neue revidierte Ausgabe. Scale 1 : 1,250,000 or 1 inch to 19·7 stat. miles. Size 25 by 30 inches. Vienna: G. Freytag & Berndt, 1914. *Price* 1.20 *Kr. Presented by the Publishers.*

Balkan States—Albania. **Freytag.**

G. Freytags Karte des Fürstentums Albanien. Scale 1 : 600,000 or 1 inch to 9·5 stat. miles. Size 25 by 18 inches. Vienna: G. Freytag & Berndt, 1914. *Price* 1 *Kr. Presented by the Publishers.*

British Isles—England and Wales. **Bacon.**

Bacon's Motoring and Cycling Road Map. Scale 1 : 126,720 or 1 inch to 2 stat. miles. Sheet: Preston District. London: G. W. Bacon & Co., Ltd., [1914]. *Price* 1*s. net each sheet. Presented by the Publishers.*

British Isles—England and Wales. **Ordnance Survey.**

Sheets published by the Director-General of the Ordnance Survey, from April 1 to 30, 1914.

6-inch maps:—

Revised quarter-sheets, with contours in blue and red. *Price* 1*s. each.*

Berkshire, 2 N.W., 7 S.E., 15 S.W., 16 N.E., 22 S.W., 24 N.E., 28 N.E., 31 N.E., 40 N.W., 48 N.W. **Denbigh,** 2 S.W., 8 S.E., 14 N.E., 18 N.E., 20 S.E., 28 S.W., 29 N.E., 34 N.E., 35 S.E. **Flint,** 1 S.W., 6 N.W., 12 N.E., 14 S.W., 15 S.W., 16 S.E. **Flint** (Det. No. 2), 21 S.E., 23 S.W. **Lancashire,** 39 N.W., 41 S.W., 49 S.W., 53 N.W., S.E. **Oxford,** 33 N.W., 49 N.E., 52 S.W., 55 N.E. **Surrey,** 14 N.W., 20 S.E., 27 S.W., 35 S.E. **Sussex,** 37 N.E., 76 N.W. **Yorkshire,** 36 N.E., 57 S.W., 58 S.W., 60 N.E., 60 S.E., 72 S.W., 86 N.W., N.E., 89 N.W., N.E., S.W., 93 N.E.

1 : 2500 scale maps:—

Revised, with Houses stippled and with areas. *Price* 3*s. each.*

Carnarvon, 7-7, 9, 12, 15, 12-1, 5, 6, 15, 17-3, 8, 18-14, 23-3, 10, 13. **Cornwall,** 45-15, 16, 46-9, 54-(3 and 7), 4-(8 and 12), 55-1, 2, 14. Sheet 46-14, *price* 1*s.* 6*d.* **Derby,** 56-1, 7. **Devon,** 123-11, 124-13. **Durham,** 57-8 (12 and 16). **Hertfordshire,** 40-2, 41-8, 12, 43-10, 16, 44-2, 5, 45-6, 7, 8, 11. **Middlesex,** 1-2, 4-16, 6-6, 7, 8, 11, 9-7, 8, 10-7, 11, 13, 11-2, 5, 14-7, 19-3, 4. Sheet 19-2, *price* 1*s.* 6*d.* **Norfolk,** 63-6, 14. **Nottingham,** 39-5, 6, 8, 9, 13, 14, 42-4, 45-7, 46-3, 5, 6, 7, 8. **Surrey,** 4-(8, 4, and 7), 11, 5-5, 11-1, 18-15, 26-5. **Westmorland,** 44-13, 46-1, 13, 16, 47-2, 4, 5, 51-2. Sheet 48-9, *price* 1*s.* 6*d.* **Yorkshire,** 13-12, 15, 14-15, 26-4, 27-5. Sheet 14-(6 and 7), *price* 1*s.* 6*d.*

Messrs. E. Stanford, Ltd., London Agents.

Europe. **Hassinger, Rothaug, and Umlauft.**

Physische Schulwandkarte der Oesterreich.-Ungarischen Monarchie und der angrenzenden Gebiete Mitteleuropas. Bearbeitet von J. G. Rothaug und Dr. R. Rothaug. Scale 1 : 900,000 or 1 inch to 14·2 stat. miles. 8 sheets, each 29 by 22 inches.—Schulwandkarte des Erzherzogtums Oesterreich unter der Enns. Bearbeitet von Joh. Georg Rothaug und Dr. Friedrich Umlauft. Scale 1 : 150,000 or 1 inch to 2·3 stat. miles. 4 sheets, each 25 by 32 inches.—Schulwandkarte des politischen Bezirkes Baden. Scale 1 : 25,000 or 2·5 inches to 1 stat. mile. 4 sheets, each 26 by 33 inches.—Schulwandkarte des politischen Bezirkes Feldbach. Herausgegeben von Feldbacher Lehrerverein 1913. Scale 1 : 50,000 or 1·3 inch to 1 stat. mile. 2 sheets, each 18 by 38 inches.—Schulwandkarte des politischen Bezirkes Koreuberg. Scale 1 : 50,000 or 1·3 inch to 1 stat. mile. Size 30 by 34 inches.—Schulwandkarte der Sudetenländer. Bearbeitet von Prof. J. G. Rothaug und Dr. Fr. Umlauft. 2. Vermehrte und verbesserte Auflage. Scale 1 : 300,000 or 1 inch to 4·7 stat. miles. 4 sheets, each 24 by 36 inches.—Schulwandkarte vom europäischen Ruszland. Bearbeitet von J. G. Rothaug und Dr. H. Hassinger. Scale 1 : 2,000,000 or 1 inch to 31·56 stat miles. 6 sheets, each 26 by 38 inches. Vienna : G. Freytag & Berndt, 1913. *Presented by the Publishers.*

These are all boldly drawn and clearly printed wall maps, intended for use in schools. The relief is shown by a series of well-selected colour tints, varying from greyish blues at 1 greens to red on the spectral system, and accentuated by neutral tint shading. The effect is, on the whole, decidedly effective, and the maps give a good general idea of the characteristic features of the country represented.

Europe. **Rothaug.**

Wandtafeln zur Geographie Europas: Januarisothermen (nach Hann); Juliisothermen (nach Hann u. a.); Jahresisothermen (nach Hann); Jährlicher Dauer des Sonnenscheins in Stunden; Klimagebiete (nach Neumann); Die flanzendecke (nach Hettner, Philippson, Drude). Bearbeitet von Dr. Rudolf Rothaug. Scale 1 : 5,000,000 or 1 inch to 78·9 stat. miles. Size 34 by 46 inches. Vienna : G. Freytag & Berndt, 1913. *Presented by the Publishers.*

A set of six school wall diagram maps suitable for small class-room use. The first three show the mean isothermal lines of Europe, in degrees of Centigrade, for January, July, and the whole year. In addition to the lines themselves, which are in red, the land within certain limits of temperature is shown by different tints. The fourth shows, by means of colour tints, the mean annual duration of sunshine in hours in different parts of Europe. If the colours had been selected so that the regions with most sunshine had been the brightest and those with the least the darkest, there would have been more consistency in the arrangement, and the map would have been more graphic in character. Place-names are only indicated by their initial letters. The fifth shows by seven different tints the characteristic climates of various parts of Europe. Names of important places are indicated by their initial letters. The sixth shows clearly by colours the characteristic vegetation of various regions of Europe. It is not obliterated by detail or names.

Europe, Central. **K. u. K. Militärgeographisches Institut.**

Generalkarte von Mitteleuropa. Scale 1 : 200,000 or 1 inch to 3·15 stat. miles. Sheets (new editions): 37°–41°, Durazzo; 38°–41°, Elbasan. Size 22 by 17 inches. Vienna : K. u. K. Militärgeographisches Institut, 1913.

ASIA.

Asia Minor. **Kiepert.**

Karte von Kleinasien bearbeitet von Richard Kiepert. Zweite berichtigte Ausgabe. Scale 1 : 400,000 or 1 inch to 6·3 stat. miles. Sheets : D–II., Adalia; D–III., Ermenek; D–VI., Nsêbin. Size 18 by 24 inches. Berlin : Dietrich Reimer (Ernst Vohsen), 1914.

A comparison of these sheets with the earlier editions will show that considerable revision has taken place, and in fact in many parts the topographical features have been entirely redrawn.

Russia. **Gowjagin.**

Wall map of Asiatic Russia. By A. M. Gowjagin. [In Russian.] Scale 1 : 6,000,000 or 1 inch to 94·7 stat. miles. 4 sheets each 26 by 36 inches. [Vienna : G. Freytag & Berndt, 1913.] *Presented by the Publishers.*

Russia. **Military Topographical Dept., St. Petersburg.**

Map of the Southern Frontier Regions of Asiatic Russia. Scale 1 : 1,680,000 or 1 inch to 26·5 stat. miles. Sheets (new editions): XI., Kasalinsk, Turkestan; XV., Peking. St. Petersburg: Military Topographical Department, 1913.

AFRICA.

Egyptian Sudan. **Survey Office, Khartoum.**

Africa. Scale 1 : 250,000 or 1 inch to 3·9 stat. miles. Anglo-Egyptian Sudan. Sheets: 77–H, Rumbek; 77–P, Meridi; 78–M, Yei; 86–A, Mont Wati. Khartoum: Survey Office, 1914. *Price* 10 *P.T. each sheet. Presented by the Director of Surveys, Khartoum.*

Nigeria. **Guggisberg.**

Africa. Scale 1 : 125,000 or 1 inch to 1·97 stat. miles. Sheets (Provisional Series): North C 31–V.II., Shaki-East; North C 31–V.IV., Lechilaku. Published by the authority of Sir Frederick Lugard, G.C.M.G., C.B., D.S.O., Governor, under the direction of Major F. G. Guggisberg, C.M.G., R.E., Director of Surveys, Southern Nigeria, and Captain R. H. Rowe, R.A., Deputy Director Topographical Branch. Revised to March, 1913. Printed at the Ordnance Survey, Southampton, 1913. Agents in Great Britain: W. & A. K. Johnston, Ltd., Edinburgh and London. *Price* 1*s.* 6*d. per sheet. Presented by the Director-General, Ordnance Survey, Southampton.*

Transvaal. **Geographical Section, General Staff**

Africa. Scale 1 : 125,000 or 1 inch to 1·97 stat. miles. Sheet, South G 35–Q III., Heidelberg. Drawn and printed at the War Office, 1914. London Agents: E. Stanford, Ltd.; Sifton, Praed & Co.; T. Fisher Unwin. *Price* 1*s.* 6*d. net each sheet. Presented by the Director of Military Operations, War Office.*

Tunis. **Service Géographique de l'Armée, Paris.**

Carte de la Tunisie. Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. Sheet CXXV., Mechehed Salah. Paris: Service Géographique de l'Armée, 1913. *Price* 1.20 *fr. each sheet.*

AMERICA.

Canada. **Dept. of the Interior, Ottawa.**

Map showing the number of Chartered Banks in New Brunswick, Nova Scotia, and Prince Edward Island. Scale 1 : 1,584,000 or 1 inch to 25 stat. miles. Preliminary edition. Prepared in the Railway Lands Branch under the direction of F. C. C. Lynch, Superintendent. Size 20 by 30 inches. Ottawa: Department of the Interior, 1914. *Presented by the Railway Lands Branch, Department of the Interior, Ottawa.*

Canada. **Dept. of Mines, Ottawa.**

Geological Survey of Canada. Map 49A (Topography), Orillia, Simcoe, and Ontario Counties, Ontario, scale 1 : 62,500 or 1·014 inch to 1 stat. mile, 1914, size 18 by 13 inches; Map 99A (Areal geology), southern portion of Cranbrook map area, East and West Kootenay, British Columbia, scale 1 : 253,440 or 1 inch to 4 stat. miles, 1913, size 8 by 19 inches; Map 101A (Geology), St. Hilaire and Rougemont Mountains, Rouville and St. Hyacinthe Counties, Quebec, scale 1 : 31,680 or 2 inches to 1 stat. mile, 1914, size 12 by 26 inches; Map 113A (Outline map), Canadian routes to White River district, Yukon, and to Chisana district, Alaska, scale 1 : 1,013,760 or 1 inch to 16 stat. miles, 1914, size 19 by 19 inches. Ottawa: Department of Mines, Geological Survey. *Presented by the Department of Mines, Geological Survey, Ottawa.*

Canada—Manitoba. **Dept. of the Interior, Ottawa**

Manitoba. Scale 1 : 792,000 or 1 inch to 12·5 stat. miles. Map showing disposition of Lands. Prepared in the Railway Lands Branch, F. C. C. Lynch, Superintendent. Corrected to January 1, 1914. Twelfth edition. Ottawa: Department of the Interior, Railway Lands Branch, 1914. *Presented by the Railway Lands Branch, Department of the Interior, Ottawa.*

United States. **U.S. Geological Survey.**

Geologic Atlas of the United States. Folios: 185, Murphysboro-Herrin, Illinois; 187, Ellijay, Georgia—North Carolina, Tennesse; 188, Tallula-Springfield, Illinois; 189, Barnesboro-Patton, Pennsylvania; 190, Niagara, New York. Washington: U.S. Geological Survey, 1912–13. *Presented by the U.S. Geological Survey.*

United States—Wisconsin. **Rand, McNally & Co.**

The Rand-McNally Indexed County and Township Pocket Map of Wisconsin. Scale 1:1,013,760 or 1 inch to 16 stat. miles. Size 26 by 19 inches. Chicago and New York: Rand, McNally & Co., 1914. *Price* $0.25.

GENERAL.

World. **Bacon.**

The School and College Atlas. One hundred and three maps, physical, political, and commercial. Index. London: G. W. Bacon & Co., Ltd., [1914]. *Price* 3*s.* 6*d.* *Presented by the Publishers.*

It is stated by the publishers that an attempt has been made in this atlas to follow the suggestion laid down in the recent memorandum of the Board of Education and of the Committee of the British Association on the effect of school books on eyesight, and so far as some of the physical maps go a considerable improvement is noticeable on those of many earlier cheap school atlases. But many of the political maps are far from satisfactory, and enough to strain the eyes of any child who attempts to make them out. Some of the maps are not up to date as regards outline and names; for instance, on 104 the north-east coast of Greenland is shown as still unexplored, and on 24 and 25 the name Congo State still appears. There are altogether one hundred and three maps, and a list of place-names with latitudes and longitudes.

World. **Rothaug.**

Karte des naturalichen Vegetations- u. Wirtschaftsgebiete der Erde. Bearbeitet von Joh. Georg Rothaug u. Dr. Rud. Rothaug. Equatorial scale 1 : 25,000,000 or 1 inch to 395 stat. miles. 4 sheets each 19 by 33 inches. Vienna: G. Freytag & Berndt, 1913. *Presented by the Publishers.*

A wall-map of the world on Mercator's projection showing by means of colours and symbols the distribution and limits of characteristic vegetation, cereals, culture of vine, coffee, tea, rice, sugar, etc., the location of important minerals, and much other information of a kindred nature. On the oceans warm and cold currents are indicated, and their importance in connection with the vegetation of the neighbouring lands is clearly shown. The map is too full of detail to be legible at any distance in a class-room, and would be required to be studied by close inspection.

World. **Rothaug.**

Vaterländischer Geographischer Schulatlas auf heimatkundlicher Grundlage in Karten und Bildern. Bearbeitet von Joh. Georg Rothaug. Ausgabe für Bohmen; Ausgabe für Niederösterreich; Ausgabe für Schlesien. Vienna: G. Freytag & Berndt, 1912. *Presented by the Publishers.*

Three editions of an atlas prepared for use in schools of Bohemia, Lower Austria, and Silesia. While some of the maps are common to all, special maps are inserted of the part of Austria for which each atlas is intended. The maps are clear and not overcrowded, and show relief effectively by the publishers' well-known system of colour tinting on the "spectral" system accentuated by shading.

In addition to the maps, which are from 33 to 63 in number, there are excellent plans, plates of views and types of races of men. These atlases are published with the approval of the Austrian Minister of Religion and Education.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, from March 29 to May 2, 1914. *Presented by the Hydrographer, Admiralty.*

New Charts—No. 3346, North sea, Germany: Jade river and Weser river entrance, 5*s.* 3506, North sea, Germany: Weser river—Hohe Weg light to Bremen (Plans: Bremer-haven and Geestemünde, Bremen), 3*s.* **New Editions**—No. 2302, Baltic, Gulf of Bothnia: Tome point round the head of the Gulf to Tauvō, 3*s.* 1106, France, north coast: Cape Flamanville to St. Marcouf islands, 3*s.* 2690, France, west coast: Cap de la Chèvre to Pointe de Corsen, including Rade de Brest, 3*s.* 3212, Mediterranean, Adriatic: Ports on the east coast of Italy—Port of Ancona, 2*s.* 201, Mediterranean, Adriatic sea: The coasts of the Gulfs of Venice and Trieste, from the mouths of the river Po (Italy) to Cape Promontore (Austria), 5*s.* 718, Indian ocean: Islands off the north coast of Madagascar—Aldabra island, Cosmoledo group, Farquhar group (João de Nova), entrance to inner harbour, Astove island, 2*s.* 50, India, west coast: Diu head to Goapnáth point (Plans: Mandwa bay, Diu harbour, Salbet, Mahuva (Mowah) bandar, 4*s.* 827, India, west coast: Vengurla to Cape Comorin. Plans added:

Chetlat island, Kiltan island, Androth island, Kalpeni island, Minikoi island, 3*s*. 737, India, west coast: Arnala island to Kundari island, 3*s*. 2621, India, west coast: Bombay harbour, 3*s*. 751, India, west coast: Malabar coast from Anjengo to Cape Comorin (Plan: Kolachel anchorage), 3*s*. 1259, Korea, south-east coast: Fusan (Pusan) harbour, 3*s*. 996, Japan, Nipon: Kii suido to Tokyo (Plans: Tago ko and Arari ko, Heda ko, Shimizu ko), 3*s*. 944, Philippine islands: Ports in the Philippine islands—Harbours south side of Busuanga island, Port Kulion, Bakuit (Port Talindak), Port Batan, 2*s*. 2468, Eastern Archipelago: Plans of anchorages in Sumba, Timor, and adjacent islands—Memboro road, Melolo road, Ilwaki road, Seba road, Naikliu road, South anchorage, Sagu bay, Atapopa (Atapupu) road, Waingapu road, Dalolo anchorage, Palmedo road. New plans of entrance to Korobafo road, Baä road, and Buka bay. Plan of Batu Bau road on this sheet erased, 2*s*. 1970, New Zealand, North island: Auckland harbour and approaches (Plan: Auckland wharves, Calliope dock and approaches), 4*s*. 856, Pacific, New Hebrides—Rannon anchorage, Sasun bay, Craig cove, Rodd's anchorage. Plan of Dip Point anchorage on this sheet erased, 2*s*. 905, Fiji islands: The coastline and reefs extending from Suva harbour to Levuka, with the adjacent islands to the eastward (Ngau, Nairai, Mbatiki, Wakava, and Makongai), 3*s*. 2222, Mexico, west coast: Guaymas harbour (Plans: Puerto San Carlos, Ensenada Bocochibampo), 2*s*. 3111, Central America, Panama: Colon harbour, 3*s*. 1266, West Indies: Islands and banks between San Salvador and Santa Domingo. 5*s*. 2689, West Indies: Eastern part of Haïti and Santo Domingo, including Mona passage. Plan added: Mona island, 3*s*. 3373, West Indies, Puerto Rico: Mayaguez bay. Plan added: Port Arecibo, 2*s*. 2860, United States, east coast: Savannah river to St. Helena sound, including Calibogue sound, Port Royal, and Broad river, 3*s*. 1735, Newfoundland, east coast: Hare bay, 2*s*. 2861, United States, east coast: St. Helena sound to Charleston harbour, including the North and South Edisto rivers, 4*s*.

(*J. D. Potter, Agent.*)

PHOTOGRAPHS.

Alps. **Johnston.**

Seven photographs of the Alps, 3¼ by 4¼ inches in size, taken by Miss Mary S. Johnston, 1912. *Presented by Miss Mary S. Johnston.*

(1) The Fiesher glacier from the Eggishorn; (2) The Rhone gorge from the Grimsel; (3) Looking north from the Grimsel; (4) End of the Rhone glacier showing rock wall now exposed; (5) "Pot holes" in the Aare gorge; (6) End of the Mer de Glace; (7) The Mer de Glace from the Chapeau.

Baluchistan. **Zugmayer.**

Fifty photographs of Baluchistan taken by Prof. Dr. Erich Zugmayer, 1911. *Presented by Prof. Dr. Erich Zugmayer.*

An important set of excellent little photographs measuring 3½ by 4½ inches. As will be gathered from the titles, some of the subjects are specially interesting.

(1) Railway through Bolan pass; (2) Sandeman Memorial Hall, Quetta; (3) Tomb of Sir Robert Sandeman, Las Bela; (4) Resident's bungalow, Las Bela; (5) Resident's bungalow, Kalat; (6) Fort and Khan's residence, Kalat; (7) Tahsildar's house, Las Bela; (8) Las Bela; (9) View from Fort Tsai Kalat; (10) Outside of Fort Tsai Kalat; (11) General view of Ormara; (12) Palm-leaf huts, Ormara; (13) Pasni; (14) Promontory of Gwadar; (15–17) Early Arab tombs of Bhavani near Las Bela; (18) Shrine of sanctuary of Hinglaj; (19) Ancient cave dwellings of Jondrani; (20) Nazim of Kej's reception house; (21) Camp in banyan and date grove; (22) Camp between Ormara and Pasni; (23) Camp near Bit Boleda; (24) Striking camp; (25) Native followers and escort, Makran levies; (26) Lasi (Las Bela) groom and Mekrani cook; (27) In the surf near Pasni; (28) Typical watering-place and leader of escort; (29) Mir Nasrullah Khan, Naib of Kej, and followers; (30) Naib of Boleda and welcome party; (31) Makran small landowner and family; (32) Native crowd at Quetta races; (33) Group of natives at Gwadar, waiting for return of fisherman; (34 and 35) Arab Wali of Gwador with son and orderly; (36) Wandering jugglers; (37) Tame buffaloes near Soniniani; (38) Burrows and sand mounds of the Ocypoda crab; (39) Crocodile dug out alive from its dry season burrow near Liari; (40) Caravan entering gorge, Taloi range; (41) Camels ascending pass, Taloi range; (42) Date grove, Samuran district; (43) Bush of dwarf palm; (44) Mud volcano near Ormara; (45) Plateau landscape, Taloi range; (46) Raised strata, Hingoe valley; (47) Raised and horizontal strata, Hingoe valley; (48) Raised and semi-raised strata, Hingoe valley; (49) Folded and refolded strata, Bit Boleda district; (50) Inclined strata, Busi Lak pass, Taloi range.

Dutch New Guinea. **Wollaston and Kloss.**

Seventy-four photographs taken on an expedition to Dutch New Guinea by A. F. R. Wollaston, Esq., M.A., M.B., and C. Boden Kloss, Esq., 1912–1913. *Presented by A. F. R. Wollaston, Esq., and C. Boden Kloss, Esq.*

The journey during which these photographs were taken was described in the *Geographical Journal* for March last. The types of natives and character of country are well represented, and as the route was to a great extent through unexplored region, the photographs have a special value. They measure 3¼ by 4¼ inches.

(1) Dutch Government S.S. *Valk*; (2) Dyaks of Wollaston's expedition; (3) Mouth of Kupera Pukwa river; (4 and 5) Coast Papuans; (6–8) Coast Papuans, Utakwa river; (9 and 10) Canoes of coast Papuans, Utakwa river; (11) Encampment of coast Papuans, Utakwa river; (12) Mouth of Utakwa river; (13) Dyak canoes up Utakwa river; (14) Towing boats up Utakwa river, Nipa palm country; (15) Camp in forest, below 1000 feet; (16 and 17) Utakwa river, about 2000 feet; (18) Native bridge across Utakwa river, 2000 feet; (19) Upper Utakwa river; (20) Tributary of Utakwa river, about 2000 feet; (21) Upper Utakwa river, 2000 feet; (22) Upper valley of Utakwa, looking north from 3000 feet; (23) Looking north from 4000 feet in Utakwa valley; (24) Native drinking from pool of hot sulphur water; (25) Steep country at 7000 feet, Utakwa valley; (26) Camp of Wollaston's expedition at 8000 feet in upper Utakwa; (27) Ridges in upper Utakwa valley looking north; (28) Native bridge across Nusula-narong river; (29) Looking south-east to Mount Utakwa from 9000 feet; (30–33) Group of mountain natives; (34) Mountain people cooking; (35) House of mountain natives; (36–48) Mountain men; (49–52) Mountain women; (53) Mountain women and children; (54) Mount Leonard Darwin from the south-east, telephoto from 43 miles; (55) Native of Mount Carstensz; (56–58) Native huts, Mount Carstensz, 6000 feet; (59) Looking south-west to Mount Venus from below summit of Mount Carstensz; (60 and 61) East peak of Mount Carstensz from due south, 6000 feet; (62) Mount Carstensz from south, telephoto from 30 miles; (63) Mount Carstensz east and west peaks, from south about 30 miles; (64) East peak of Mount Carstensz, from south about 16 miles; (65) Mount Carstensz from the south at 9500 feet; (66) *Podocarpus papuanus*, highest trees at 10,500 feet on Mount Carstensz; (67) Camp of Wollaston's expedition, 10,500 feet on Mount Carstensz; (68 and 69) Cliffs of Mount Carstensz, 10,500 feet; (70) Looking south from 13,500 feet on Mount Carstensz; (71) Looking west by south to Mount Cockscomb from 13,500 feet on Mount Carstensz; (72 and 73) Icefall on Carstensz glacier looking east, 14,800 feet; (74) New snow below west peak of Carstensz, looking west.

East Africa. **Harley.**

Photographs of the Crater lake on Summit of Mount Elgon, taken by Geoffrey Harley, Esq. *Presented by Geoffrey Harley, Esq.*

Enlargement of a photograph taken from south-east of the Crater of Mount Elgon at an approximate altitude of 13,500 feet, about 15,000 feet above the Bamboo line. Size 12 by 15 inches, framed. Now on view in Society's photograph room.

Egypt. **Johnston.**

Twelve photographs of Thebes, Egypt, taken by Miss Mary S. Johnston. *Presented by Miss Mary S. Johnston.*

(1 and 2) The mountains of Thebes; (3) End of Wadeyen, mountains of Thebes; (4) Part of Wadeyen, mountains of Thebes; (5) Stones, mountains of Thebes; (6) Cliff above Tombs of the Queens; (7) Going up valley Tombs of the Kings; (8) Weathered limestone, valley of Tombs of the Kings; (9) Near Der el Medinet; (10; Top of the ridge where the flint implements are fouud; (11) Scree near Der el Bahri) (12) The bridge above Der el Bahri.

Himalayas. **Noel.**

Six photographs of the Himalayas, taken in the neighbourhood of Kangchenjunga by J. B. Noel, Esq., East Yorkshire Regt. 1913. *Presented by J. B. Noel, Esq.*

A set of excellent sepia-toned enlargements of photographs taken by Mr. J. B. Noel during his recent expedition. They are striking views, measuring 15 by 20 inches, suitably framed, and now on view in the Photograph Room of the Society.

(1) Kangchenjunga and the 19,000 feet gap, from the head of the Zemu glacier; (2) Simvu and Green lake, Zemu glacier; (3) Siniolchum and Little Siniolchum from the Zemu glacier; (4) Tent peak, Tent peak pass, and Green lake glacier; (5) Kangchenjhan from the north; (6) Tsen-gui-kang.

Kashmir. **Lillingston**

Twenty-one photographs of the Wardwan valley, Kashmir, taken by Miss K. Innes Lillingston. 1912. *Presented by Miss K. Innes Lillingston.*

A small set of photographs, measuring 2¼ by 3¾ inches. They are typical of the region traversed by Miss Lillingston.

(1) Inshin, Wardwan valley; (2) Basman; (3 and 4) Gumber pass; (5) Sona Sar. (6) Snow bridge near Suknes; (7 and 8) Wardwan valley; (9 and 10) Barmal glacier; (11) Glacier table, Barmal glacier; (12 and 13) Icefall Barmal glacier; (14–16) Nun Kun from the Suru valley; (17) Nun Kun; (18) Villagers, Suru valley; (19) View from "col" near Umba; (20) Lamagus La; (21) Gorge near Dras.

North-East Frontier of India. **Hensley.**

Ten photographs of the Mishmi country, North-East Frontier of India, taken by Captain F. K. Hensley. *Presented by Mrs. Haig Brown.*

These photographs are specially interesting, as they are of a region very imperfectly known. They serve well to illustrate the character of the scenery, and some of them are specially good. In size they measure 3¼ by 5½ inches.

(1) Yuron waterfall, Dri valley, a drop of 3000 feet partly shown in photograph; (2) A Mishmi made bridge over the Awa stream; (3) Mishmi suspension bridge, No. 9 Dri post; (4) A view up the Dri valley; (5) Waterfall, Dri river; (6) Waterfall, Dri valley; (7) Bridging the Dri above its confluence with the Jairu; (8) A view up the Jairu valley; (9) Tupu interpreter and his wife; (10) The home of the takin.

South Africa. **Rogers.**

Ten photographs of the Orange River, South Africa, taken by Arthur W. Rogers, Esq., 1913. *Presented by Arthur W. Rogers, Esq.*

An excellent set of enlargements, measuring 9½ by 12½ inches, carefully titled and described.

(1) Looking up Orange river from near Kwab's drift, the end of the Neint Nababeep range in middle distance; (2) Looking across Orange river; (3) Looking north-east at the western scarp of the Neint Nababeep range; (4) Looking east up the Orange river near Viol's drift; (5) Looking north at the end of the Neint Nababeep scarp; (6) The eastern face of Neint Nababeep range, 2 miles south of Viol's drift; (7) Looking east up Orange river from the west side of the end of Henkries valley; (8) Looking east-north-east across Orange river from left bank, 2 miles above entrance of Henkries valley; (9) Looking west down Orange river from the west side of entrance of Henkries valley; (10) Looking east-south-east across Henkries valley.

West Africa. **Nugent.**

Fifty-four photographs, taken on the Nigeria-Kamerun Boundary Commission of 1912–1913 by Captain W. V. Nugent, R.A.

These small photographs of various sizes and merit were taken during the expedition of which Captain Nugent recently gave an account before the Society. They are as follows:—

(1) Cross river at Obokum; (2) Magbe river-boundary; (3) Mahana river; (4) Junction of rivers Maquari and Morn; (5) Needle peak, Katsena valley; (6) Munchi girl; (7) Munchi dance; (8 and 9) Crossing Katsena river; (10) at Takum; (11) Pambo village, Zumperi country; (12) View in Zumperi country; (13) Views in Zumperi hills; (14) Zumperi village; (15 and 16) Zumperi women; (17) Old Zumperi woman; (18) Zumperi men; (19) Zumperi types; (20) Kungana hills; (21) Gamana river at boundary; (22) Boundary cutting near Gamana river; (23) Clearing for causeway, Gamana river; (24) Lissa villages; (25) Bridging the Teraba; (26) Teraba river camp; (27) Shrines, Dirim pagans, Kam valley; (28) Boundary poles, Mount Dakka camp; (29) Group on Mount Dakka; (30) Camp under Mount Dakka; (31 and 32) Dakka pagans; (33) Cairn on Basalt plateau; (34) Bayare; (35) Camp at Bayare; (36) Group, A.G.B.C.; (37) Oberleutnant Detzner; (38) Putting in a boundary post; (39) A boundary post; (40) Boundary cutting; (41) Hippopotami; (42) Cutting up a hippopotamus; (43) Camp in a "curmi"; (44) Ju-ju house; (45) Natives bringing in supplies; (46) Guinea corn; (47) A typical hill; (48) Building a grass house.

N.B.—It would greatly add to the value of the collection of Photographs which have been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

WEST AFRICA

Map to illustrate the paper on the NIGERIA-KAMERUN BOUNDARY COMMISSION of 1912-13.

by
CAPT. W.V. NUGENT, R.A.

This map is based
von Kamerun mit To
by Max Moisel, from
German Officers of t
Commission, combine
published in the Mi
gebieten, Band xxvi.

Nigeria-Kameru
Railways open
" constru
Roads and Tracks
Heights given in fig
are in metres.

Scale 1 : 2,000,000 or 1 Inch = 31·56 Stat. Miles.

10 0 10 20 30 40 50 100 Miles

REFERENCE

HEIGHTS. METRES	FEET	DEPTHS. METRES	FEET
0	0	0	0
250	820	250	820
500	1640	500	1640
750	2461	750	2461
1000	3281	1000	3281
1500	4921		
2000	6562		
2500	8202		
3000	9843		
4000	13124		

9° 10°

8° 7° 6°

Udeni
Bokoro
R. Benue
To Kaduna
Kwale
Burrows
Abinsi
From Port Harcourt
R. Kwatasse
R. Lafia
Katsena Alia
R. Kwatasse
Takum
Wukari
Akwana
Donga
Amar
R. Benue
Mutum Biu
Sendridi
Gazael
Ibi
Bantaji
R. Taraba
Bakundi
R. Suntai
Suntai
Arnga
Tissa
Fali Mts
Kunabai
Galea
Gr. Nappa
Wawoya Mts
Pambe
Ibbo
Bantu
Lupin
Bumbo
Kentum
Mbakom
Ogoja
Obudu
Obe
Sonkwala
Bateriku
Bakakum
Abakaliki
Ashoban
Mbam
Afiuna
Obubra
Nkanasa
Ikom
Obokum
Mkpani
Inoafan
Keakam
Bamenda
Batibo
Batut
Bafut
Bali
Metchenge
Mukuru
Vyim
Wase
Kauru
Bekom
Hills
Wurkam
Ajahi
Egobi
Alkwa R.
Okpoma R.
Okpariku
Abuochiri R.
Ashoban R.
Mbam R.
Afiuna R.
Nkanasa R.
Ukpon R.
Ikom R.
Obokum R.
Mkpani R.
Inoafan R.
Keakam R.
Mbu R.
Bamenda R.
Mbu R.
Bafut R.
Bali R.
Kauru R.
Wase R.
Vyim R.
Mukuru R.
Metchenge R.
Bekom R.
Kentum R.
Mbakom R.
Bumbo R.
Lupin R.
Pambe R.
Wawoya R.
Kunabai R.
Tissa R.
Suntai R.
Arnga R.
Bantaji R.
Ibi R.
Amar R.
Mutum Biu R.
Sendridi R.
Gazael R.
Taraba R.
Bakundi R.
Wukari R.
Donga R.
Akwana R.
Abinsi R.
Udeni R.
Bokoro R.
Kwale R.
Burrows R.
Katsena Alia R.
Takum R.
Lafia R.
Kwatasse R.
Kumasso R.
Amek R.
Kasimbon R.
Kwaru R.
Kwanja R.
Kwanja R.
Kwanja

11°
12°
is based upon the Hohenschichtenkarte
run mit Togo, on the same scale, compiled
toisel, from the Surveys of British and
fficers of the Nigeria-Kamerun Boundary
n, combined with other information; and
in the Mitt. aus den deutschen Schutz-
and xxvi. Heft 4.
Kamerun Boundary
s open
constructing
d Tracks
iven in figures on the map
tres.
Shillem
Goila
Zummu
Soug
Lamurde Kota
Kiri
YODA
Malabu
Numan
Namtari
Dashin
YOLA
Vere Mts
Toja Mts
Jalingo
Shebshi
Mountains
Daske
Voreen Pk
Mantika
Chamba
Bangtang
Mts
Mountains
Ba Kussum
Shina Ridge
Itaro
Shekussum
Konoha
Mana Mts
Wonka Mts
Dodo Mts
Gan Gorama Mountains
Sangere
Tingere
Hendu
Yakuba Mts
Dyingo Mts
Ranjo
Rerim
Tibati
Rubgo Mts
Prinz Luitpold Mts
Ibuatam
Bamkin
Nyiwa
Mediu Mts
9°
8°
7°
6°

Published by the Royal Geog

yal Geographical Society.

NIGERIA-KAMERUN BOUNDARY COMMISSION.

NUGENT.

NOTE.--The outlines of the lakes are taken from the "Map of Part of Western Australia showing Goldfields and Mining Centres" (Scale 10 miles to 1 inch), issued by the Mines Department of Western Australia; 1908, from maps published by the Commonwealth Government of Australia, and the Geological Survey of Western Australia. Some modifications and additions are made from other sources. The heights are mainly from the Railway Levels.

116 118 120

26 28 30 32 34

L. Gregory
L. King
Murchison R.
1400
Swamp
1562
Sanford R.
L. Austin
L. Mason
Sir Samue
L. Miranda
1850
2000
Mt Holmes
2000
Greenough R.
1138
905
Salt Lake
1700
1600
Irwin R.
Weelhamby L.
L. Monger
L. Barlee
1100
Yarra Yarra L.
L. Giles
L. Moore
218
Hill R.
390
L. Deborah
L. Seabrook
Cowcowing L.
919
453
Moore R.
404
392
896
L. Brown
909
1301
1163
1484
1133
715
802
Swan R.
490
Northam
PERTH
Fremantle
Avon R.
L. Carmody
Fresh
Murray R.
355
1688
L. Grace
Bunbury
Busselton
Blackwood R.
Pallinup R.
Warren R.
Frankland R.
Albany

116 118 120

Published by the Royal Geographical Socie

ical Society.

LAKE SYSTEM OF WESTRALIA
Gregory.

INDEX.

* Denotes Articles and Papers. † Bibliographical Entry.
§ Reviews and Notices.

A.

Abbot, C. G., and others, Annals of Astrophysical Observatory of Smithsonian Institution, 355 †; Solarkonstante und ihre Schwankungen, 355 †; Volcanoes and climate, 222 †
Abyssinia—
  Au Pays Ghimirra: G. Montandon, 430 §
  Einfluss des geographischen milieus auf die rassiale und kulturelle Entwicklung Abessiniens: L. R. v. Sawicki, 465 †
  Maps: Abyssinia (Geog. Section, General Staff), 108 †
  Rerum Æthiopicarum scriptores occidentales inediti a sæculo XVI. ad XIX.: C. Beccari, 351 †
Ackermann, J., Australia from a Woman's Point of View, 436 §
Ada-Kaleh—
  Annexion von Ada-Kaleh durch Oesterreich-Ungarn: H. Wichmann, 461 †
Adamović, L., Vegetationsbilder aus Dalmatien, 461 †; Verbreitung der Holzgewächse in den Dinarischen Ländern, 349 †
Adams, H., Practical survey and elementary geodesy, 221 †
Adams, M. I., and others, Guide to principal Parliamentary Papers relating to Dominions, 1812–1911 .. 105 †
Adare, Cape, Antarctic, 2
Admiralty Charts, † 113, 230, 362, 479, 603, 727
Admiralty Islands—
  Beobachtungen von den Admiralitätsinseln: L. Cohn, 718 †
Admiralty range, Antarctic, 1
Adrianople Map: K. u. K. Militär. geogr. Institut, 475 †.
Adriatic Sea—
  Correnti del mare Adriatico, Studio delle: G. Feruglio, 222 †
  Gezeiten von Ragusa, St. Andrea und Pelagosa: H. Dannies, 460 †
  Najade, S.M.S., Ergebnisse der 7 Terminfahrt in der Adria: A. Steuer, 460 †; Fünfte Terminfahrt in der Hochsee der Adria, 1912–1913: A. Grund, 460 †
Africa—
  Afrika und die Europäer: K. Dove, 715 †
  Anthropological Survey of British African Possessions, Need for, 580
  Austral-African Notes and Anecdotes: A. J. N. Tremearne, 329 §
  Bonds of Africa: O. Letcher, 351 †
  Central—
    Journey by Miss G. E. Benham across Central Africa, 81
    Winning a primitive people: D. Fraser, 104 †, 328 §
  Climatic changes, 298
  East Coast, Tides and Currents on, 205
  French Equatorial—
    Sociétés Primitives del l'Afrique Equatoriale: A. Cureau, 572 §
  French West—
    Circonscription du Batha: — Lagrange, 352 †
    Détermination de différence de longitude par télégraphie sans fil: Schwartz et Villatte, 103 †
  German East—
    Ethnographie des Abflusslosen Gebietes Deutsch-Ostafrikas: O. Reche, 594 †
    Hochland der Reisenkrater und umliegenden Hochländer Deutsch-Ostafrikas: F. Jaeger, 216 †
    Kagerafluss in Ostafrika und die Ruandabahn: H. Meyer, 716 †
    Nordwestlichen Gebiete Deutsch-Ostafrikas: — Schee, 216 †
    Oestliche Abschnitt der Grossen Ostafrikanischen Störungszone: E. Obst, 466 †
    Unknown tribe discovered by E. F. Kirschstein, 82; letter on: A. Dewar, 588
  German, South-West—
    Karte des "Deutsch-portugiesischen Grenzgebiete in Südwestafrika," 716 †
  Hirtenvölker in Asien and Afrika: F. Hahn, 471 †

Africa—*continued.*
Lebensformen und Lebensweise der Tierwelt im tropischen Afrika: L. Waibel, 465 †
Maps—
Africa (Geog. Sect., Gen. Staff), 227 †, 476 †, 601 †; (Survey Dept., Khartoum), 227 †
Afrique Équatoriale Française, Carte Générale: G. Delingette, 109 †
Afrique Physique et Politique: M. Dubois et J. G. Kergomard, 601 †
Cape of Good Hope (Geog. Sect., Gen. Staff), 227 †
Côte Ouest d'Afrique (Mission Hydrog. du Gabon), 363 †
Deutsch-Portugiesischen Grenzgebiets in Südwestafrika: P. Sprigade, H. Nobiling und M. Groll, 228 †
Deutsche Zones des Okawango nach den Aufnahmen Franz Seiner's im Jahre 1911..228 †
Deutschen Grenze zwischen Yola und den Crossschnellen, Uebersichtskarte: M. Moisel, 360 †
East Africa Protectorate (Geog. Section, General Staff), 476 †, 601 †
Garnison Umgebungs-Karte von Massoko: v. Trotha, 358 †
Geological Map of Union of South Africa (Geol. Survey), 359 †
Geologische Uebersichtskarte des Kaokofelds: J. Kuntz, 359 †
Küstengebietes zwischen Hottentottenbucht und Empfängnisbucht: E. Reuning, 359 †
Meyer's Ostafrika-Expedition, 1911.. 227 †
Railway Map of South Africa, 228 †
Sudan (Survey Dept., Khartoum), 227 †
Triangulationsnetzes der Yola-Crossschnellen-Grenzexpedition: Detzner, 360 †
Wall Atlases, Philips' Comparative Series: J. F. Unstead and E. G. Taylor, 108 †
North—
Italy in North Africa: W. K. McClure, 328 §
Materialen zu den Reisen von Gerhard Rohlfs und Gustav Nachtigal: A. v. Bilguer, 466 †
Strabos Erdkunde von Libyen: F. Strenger, 466 †
Omaheke, Ergebnisse einer Bereisung der, in 1910–1912: F. Seiner, 466 †
Photographs of East Africa Protectorate: J. P. Clark, 480 †
Sleeping Sickness, Relationship of Big Game of Africa to spread of: W. Yorke, 715 †
South—
Africanderisms: C. Pettman, 352 †
Africa—*continued.*
South—*continued.*
Conquest of the Desert: W. MacDonald, 685 §
Earthquake of South African tableland, Note on: J. R. Sutton, 217 †
English people overseas. South Africa, 1486–1913: A. W. Tilby, 594 †
Forestry in relation to irrigation: K. A. Carlson, 717 †
Further Reminiscences of a South African Pioneer: W. C. Scully, 688 †
Guide to South and East Africa: A. S. and G. G. Brown, 217 †
Historical Geography of British Colonies, Vol. 4, South Africa: Sir C. Lucas and A. B. Keith, 352 †
Pioneers in South Africa: Sir H. Johnston, 217 †
Rise of South Africa: G. E. Cory, 352 †
Seven Lectures prepared for Visual Instruction Committee of Colonial Office: A. J. Sargent, 466 †
South African scene: V. R. Markham, 216 †, 430 §
Tidal phenomena at inland boreholes near Craddock: A. Young, 82
Tribal Movements, letters on: R. Avelot. 95, Sir H. H. Johnston, 96
Tribe, South African, Life of: H. A. Junod, 324 §
Wirtschaftliche . . . Bedeutung der südafrikanischen Kohle: R. Kleinkemm, 716 †
West—
Armée noire Anglaise en Afrique occidentale: M. Mercadier, 716 †
Geological structure: J. Parkinson, 467 †
Geologie, Regionalen, Handbuch der, Bd. 7, Afrique Occidentale: P. Lemoine. English Colonies on west coast of Africa and Liberia: J. Parkinson, 594 †
Health preservation in: J. C. Ryan, 467 †
Historical Geography of British Colonies: Sir C. P. Lucas. Vol. 3. West Africa: A. B. Keith, 351 †
Languages: F. W. H. Migeod, 431 §
Voyage dans l'Afrique Occidentale, 1843 et 1844: A. Raffenel, 106 †
Agassiz, A., Letters and recollections of: G. R. Agassiz, 356 †, 437 §
Aggazzotti, A., Respirazione cutanea in alta montagna, 598 †
Agriculture—
Tropical, Third International Congress of, 700
Aicardi, G., Popolazione nella Riviera Ligure dal 1861 al 1901..101 †
Ailly, P. d', et la découverte de l'Amerique: L. Salembier, 218 †

Alai-Pamirs Expedition of German and Austrian Alpenverein, 182
Alaska—
Coastal glaciers of Prince William Sound and Kenai Peninsula: U. S. Grant and D. F. Higgins, 353 †
Earthquake at Yakutat Bay, September, 1899: R. S. Tarr and L. Martin, 192 §
Geologic reconnaissance of Fairbanks Quadrangle: L. M. Prindle and others, 353 †; Rampart Quadrangle: H. M. Eakin, 353 †
Geology of Nome and Grand Central quadrangles: F. H. Moffit, 353 †
Glacial deposits of continental type in Alaska: R. S. Tarr and L. Martin, 353 †
Glaciers, Alaskan, in relation to life: L. Martin, 717 †
Glaciers and glaciation in College Fiord, Some features of: L. Martin, 717 †
Koyukuk-Chandalar region: A. G. Maddren, 353 †
Albania—
Frontiers of, 560
Landeskunde Albaniens: G. A. Lukas, 460 †
Maps: Karte des Fürstentums Albanien: G. Freytag, 724 †
Alberta—
Maps: Southern Alberta (Dept. of Interior, Ottawa), 360 †
Alcock, F., West Indian Scenery. Water-colour sketches, 116 †
Aldrich, L. B.: *see* Abbot, C. G.
Alexander, Boyd and Claud, Memorial to, at Cranbrook, 88
Alexinsky, G., Modern Russia, 427 §
Algeria—
Haouara, Pays des: — Lafaye, 715 †
Maps: Carte de l'Algérie (Service Géog. de l'Armée), 476 †, 601 †; Carte des Voies de Communication (Gouvernment Gén. de l'Algérie), 476 †
Tiaret, Monographie de la région de: H. Barlette, 716 †
Trockengebiete Algeriens: S. Passarge 465 †
Ali Bransa, Siachen Glacier, Stone shelters at, 120, 138, 145
Aliotti, Barone C., Il "dry farming" e la coltura del cotone . . . al Messico, 217 †
Allanby, A. C. H., Tides and Currents on East Coast of Africa, 205
Alleghenies—
Alleghenian divide and its influence upon freshwater fauna: A. E. Ortmann, 205 §, 468 †
Physical history, 205
Alluvial fan formations, Petrographic designation of: A. C. Lawson, 222 †
Alpes Maritimes—
Végétation des Alpes maritimes: L. F. Tessier, 349 †
Alps—
Eiszeitliche Vergletscherung der Alpen: R. v. Klebelsberg, 710 †
Excursions in the Alps, Journal of: W. Brockedon, 106 †
Geologische Gerust der Lechtale Alpen: O. Ampferer, 710 †
Glazialgeologische Notizen vom bayrischen Alpenrande: R. v. Klebelsberg, 461 †
Gletschermessungen . . . in den Oetztaler Alpen, 1912: R. v. Klebelsberg, 461 †
Hannibal once More: D. W. Freshfield, 680 §
Morphologie des Alpes françaises: W. Kilian et P. Reboul, 461 †
Photographs of Alps: Miss M. S. Johnston, 728 †
Präglazialen Ausschen der Alpen, Ueber den heutigen Stand unserer Kenntnis vom: H. Lautensach, 461 †
Tektonik der unteren ostalpinen Decken Graubündens: D. Trümpy, 710 †
Vegetationsverhältnis-e der Schneestufe in den Rätisch-Lepontischen Alpen: J. Braun, 461 †
Wasserführung des Suldenbaches: R. v. Klebelsberg, 710 †
Altai—
Kalkinskigebirge im Westlichen Altai im or graphischer und geologischer Beziehung: V. Obrucheff, 464 †
Altitudes—
Altitude Insomnia, letter on: W. H. Workman, 97
Formule barométrique simplifiée pour la mesure des altitudes: A. Berget, 221 †
Respirazione cutanea in alta montagna: A. Aggazzotti, 598 †
Alum—
Porvenir de la industria del jebe en el Perú: E. Castre, 469 †
Amazon—
Expedition sent out by University Museum: W. C. Farabee, 468 †
Amber—
Bernsteinwege der Altertums: W. J. Beckers, 598 †
Ambrym island, volcanic eruption, 208
A'mekh river, Burma, 529
America—
Latin American railways, present and projected: W. H. Schoff, 353 †
America, Central—
Future of Tropical America, 219 †
Mittelamerikanische Vulkane: K. Sapper, 469 †
Pioneers in tropical America: Sir Harry Johnston, 104 †
Republics of Central and South America: C. R. Enock, 434 §
Windverhältnisse über Mittelamerika und seiner Umgebung: E. Lottermoser, 469 †

America, North—
Animal communities in temperate America: V. E. Shelford, 468 †
Climatic changes, 299
Découverte de l'Amérique, Pierre d'Ailly et la: L. Salembier, 218 †
Erste Entdeckung Amerikas im Jahre 1000 n. Chr.: G. Neckel, 329 §
Freshwater fauna and changes in River Systems, Distribution of: A. E. Ortmann, 205 §
Norse visits, Early, to North America: W. H. Babcock, 194 §, 353 †
Terrestrial gravity and observed earth-movements of Eastern America, Relationship between: J. W. Spencer, 217 †
Voyage fait . . . en 1750 et 1751 dans l'Amérique Septentrionale: J. B. de Chabert, 106 †
America, South—
Continents and their people. South America: J. F. and A. H. Chamberlain, 595 †
Expedition by Mr. Roosevelt, 697
Making of the nations. South America: W. H. Koebel, 354 †
Pacific shores from Panama: E. Peixotto, 354 †
Plate, River, and back, To the: W. J. Holland, 354 †
Railways of South America: W. A. Reid, 595 †
Republics of Central and South America: C. R. Enock, 434 §
Voyage aux Isles de Trinidad de Tobago, etc.: J. J. Lavaysse, 106 †
Wilds, A Church in the: W. B. Grubb, 688 §
American Geographers, Association of, Annual Meeting, 1914..449; Joint Meeting with American Geographical Society, 696
Americanists, Congress of, The Nineteenth, 88
Amiri river, Nigeria-Kamerun boundary, 643
Ammann, H., Zur Bedeutung der Farbe des Seewassers, 597 †
Ampferer, O., Geologische Gerust der Lechtale Alpen, 710 †
Amundsen, R., Arctic Expedition, 448
Anantha Krishna Iyer, L.K., Cochin Tribes and Castes, 568 §
Anderson, F., Report on Survey Work in Hudson Bay and Strait, 339
Anderson, J. D., Peoples of India, 102 †
Andes—
Asymetrical crest lines and abnormal valley profiles in Central Andes: I. Bowman, 720 †
Andrée, K., Palãogeographische Bedeutung sedimentpetrographischer Studien, 471 †
Andrews, E. C., Beach formations at Botany Bay, 220 †
Anfossi, G., La precipitazione media nel bacino del Po, 101 †
Anglo-Saxon settlements, Archæology of: E. T. Leeds, 102 †, 322 §
Année Cartographique: F. Schrader, 230 †
Antarctic—
Anglo-Swedish Expedition, Plan for an: L. Palander and O. Nordenskjöld, 554 *
Antarctica and some of its Problems: T. W. E. David, 605 *
Austrian Expedition under Dr. König, Plans for, 208; Osterreichischen Südpolarexpedition, Plan einer (Grafen Wilczek), 596 †
Bibliographie Antarctique: J. Denucé, 719 †
British Expedition, 1910–1913: Exhibition of Collections at British Museum, 88; Memorials to Captain Scott and his companions, at Lautarets and London, 342; Work and Adventures of Northern Party of Captain Scott's Expedition: R. E. Priestley, 1 *
Coalfield, 625
Geologie, Regionalen, Handbuch der, Bd. 8, Antarktis: O. Nordenskiold, 470 †
German Expedition: Deutschen Antarktischen Expedition, Ozeanographische Arbeiten des: W. Brennecke, 597 †; Deutsche Südpolar-Expedition, 1901–1903: E. von Drygalski, 105 †
Ice Age, Problems of the, Bearing of Facts revealed by Antarctic Research, upon, letter on: M. Manson, 706
Imperial Trans-Antarctic Expedition, 1914: Sir E. Shackleton, 173 *, 318 *
Mawson's Expedition, Return of, 413
Meteorological Station in South Orkneys, 341
Mountain ranges, 608
Penguins, Antarctic: G. M. Levick, 596 †
Schneegrenze in der Antarktis: E. Brückner, 470 †
'Scott's Last Expedition,' Review on, by Sir C. R. Markham, 16
Shackleton in the Antarctic . . . 1907–1909: Sir E. Shackleton, 355 †
Shackleton's Expedition, Government support for, 448
South Magnetic Pole area, Observations in: T. W. E. David, 470 †
Südgeorgien, Bericht über die Tätigkeit nach Verlassen von: E. Przybyllok, 470 †
Swedish Expedition to Graham Land, 341
Anthropogeography—
Natur und Mensch: M. G. Schmidt, 471 †
Anthropological Survey of British African Possessions, Need for, 580

Appleton, H., Photographs of Olympic mountains, Washington, 364 †
Arabia—
Journey through Central Arabia: G. Leachman, 500 *
Photographs: G. E. Leachman, 480 †
Südwestliche Arabien: W. Schmidt, 350 †, 465 †
Arabic and Chinese trade in Walrus and Narwhal Ivory: B. Laufer, 350 †
Araguaya—
Hauptsächlichsten Ergebnisse der Araguaya-Reise: W. Kissenberth, 218 †
Aral sea—
Reduction of, 295
Aramia river, Papua, 409, 410
Arbenz, P., Faltenbogen der Zentral- und Ostschweiz, 710 †; Ueber Karrenbildungen, 355 †
Archangelsk—
Povenets à Arkangel'sk: J. Legras, 213 †
Arctic—
Expeditions: Amundsen's, 448; Stefánsson's, 85, 341, 447
Holländer in den Polargebieten, Fahrten und Forschungen der, 105 †
Ice conditions in 1912..209
Ice in Arctic Seas, 1912, State of: C. I. Speerschneider, 221 †
Life in the Arctic, Misconceptions about: V. Stefánsson, 220 †
Photochemischen Klimas der Arktis, Zur Kenntnis des: M. P. Porsild, 719 †
Ten years near the Arctic Circle: J. J. Armistead, 101 †
Ard-el-Madhua, Arabia, 507
Ardrar, De l', au Cameroun: G. de Gironcourt, 217 †
Argentine—
Agricoltura argentina, I progressi dell': P. Gribaudi, 717 †
Argentinien: F. Regel, 353 †
Argentinien in geographischer, geschichtlicher und wirtschaftlicher Beziehung: W. Schmidt und C. Grotewold, 435 §
Hochkordilleren von San Juan: F. Kühn, 468 †
Junge fluviatile Aufschüttungen in den nordlichen argentinischen Anden: H. Keidel, 468 †
Maps: Vegetationskarten aus dem nordwesten Argentiniens: H. Seckt, 602 †
Salta, Exploración de la región petrolífera de: G. Bonarelli, 353 †
Sierra de la Lumbrera: P. Denis, 717 †
Argyll, Duke of, obituary, 700
Arldt, T., Mittelmeerische Gürtel und seine erdgeschichtliche Bedeutung, 720 †
Armenia—
Routenaufnahmen in Armenien und Kurdistan: Graf v. Westarp, 715 †
Armistead, J. J., Ten years near the Arctic Circle, 101 †
Arndt, A., Ueber die Bora in Noworossisk, 465 †
Artaria's Eisenbahnkarte von Oesterreich-Ungarn und den Balkanländern, 225 †
Aruba—
Maps: Topographische Kaart van Aruba (Top. Bureau, The Hague), 361 †
Asia—
Asia: a Geography Reader: E. Huntington, 199 §
Central: Expeditions: F. De Filippi's, 32 *, 672; Sir A. Stein's, 1913–1914.. 440; Z. Tachibana's, 80
Climatic changes, 293
Desiccation in Central and Western Asia, 149, 293, 707
Geographische und historische Erforschung des Orients: W. Barthold, 102 †
Glaciation in, 452
Hirtenvölker in Asien und Afrika: F. Hahn, 471 †
Journey from India towards England in 1797: J. Jackson, 106 †
Ptolemy's Geography of South-Eastern Asia: A. Herrmann, 579
Vorderasienexpedition 1906 und 1907: H. Grothe, 72 §
Asia Minor—
Maps: Distribution of mineral products and railways of Asia Minor: L. Dominian, 475 †; Kleinasien: R. Kiepert, 725 †
Oestliche Mysien und die benachbarten Teile von Phrygien und Bithynien: A. Philippson, 465 †
Vulkangebiet von Kula in Lydien: A. Philippson, 465 †
Askwith, Sir G. R., Venezuela and British Guiana Boundary Arbitration, 106 †
Assada, I., Types de ports, 223 †
Atiu island, Some notes on: J. T. Large, 220 †
Atlantic—
Bemerkungen zu G. Schotts 'Geographie des Atlantischen Ozeans': O. Pettersson, 597 †
Dust-falls in the Atlantic: G. Hellmann, 87
Eiszeit, Atlantische Ozean während der: O. Pettersson, 721 †
Fishing-banks off our Atlantic Coast: G. C. Curtis, 218 †
Maps: Meteorological Charts of North Atlantic and Mediterranean (Met. Office), †114, 231, 363, 479, 604; Pilot Charts (U.S. Hydrog. Office), †114, 231, 363, 479, 604
Michael Sars North Atlantic deep-sea expedition, 1910, Report on scientific results: Sir J. Murray and J. Hjort, 471 †
Surface temperature of sea in Northern

Atlantic—*continued.*
Atlantic Ocean and Davis Strait, 1912..223†
Waters of North-East North Atlantic. Investigations made during cruise of *Frithjof*: F. Nansen, 721†
Atlantis—
Problème de l'Atlantide et la Zoologie: L. Germain, 222†
Atlases—
Année Cartographique: F. Schrader, 230†
Calendario Atlante De Agostini 1914.. 478†
Chamber of Commerce Atlas, Philips', 603†
Comparative Atlas, Physical and political: J. G. Bartholomew, 361†
Formæ Orbis Antiqui: H. Kiepert, 603†
Geographisch-Statistischer Universal-Taschen Atlas: A. L. Hickmann, 229†
Modern School Atlas of Comparative Geography: G. Philip, 362†
New Era School Atlas: W. & A. K. Johnston, 362†
School Atlases, Discussion on, 424
School and College Atlas: G. W. Bacon & Co., 727†
Vaterländischer Geographischer Schulatlas: J. G. Rothaug, 727†
Wall Atlas of Modern History: R. Muir and G. Philip, 362†
Atmosphere—
Gesamtkreislauf der Atmosphäre, Jetzige Stand der Kenntnis vom: R. Süring, 597†
Audoin, —, Exploration of northern affluents of Shari, 442: Mission hydrographique du Gabon, 352†
Aurigemma, S., Campagne libiche della Missione Archeologica Italiana, 717†
Australia—
Australia from a Woman's Point of View: J. Ackermann, 436§
Desiccation of Central Australia, 305
Evolution of a Capital. A Physiographic Study of Foundation of Canberra: G. Taylor, 378*, 536*
Lake System of Westralia: J. W. Gregory, 656*
Maps: Commonwealth of Australia, 111†; Southern portion of South Australia (Survey Dept., Adelaide), 111†: Western Australia (Dept. of Lands and Surveys), 229†
Murray river storage scheme, 697
New World of the South: W. H. Fitchett, 220†
Northern Territory, Aboriginals of: W. B. Spencer, 718†
Photographs of Federal Capital Territory: Messrs. Howard and Sheersby, 363†
Population, Distribution of, 382
River system of South-East Australia, 538
Austria—
Dachsteingebiet: F. Simony, 106†
Eisverhaltnisse der oberen Weichsel, etc.: St. Pawlowski, 461†
Folkloristische Studien aus dem niederösterreichischen Wechselgebiete: E. Hamza, 710†
Historischen Geographie des Bachern-gebirges in Südsteiermark: P. Schlosser, 461†
Kammerbühl bei Eger: E. Kaiser, 461†
Maps: Lechtaler Alpen, Arlberg Gebiet. (Deutsch. u. Oesterreich Alpen. Verein), 723†; Nieder-Osterreich im Zeitalter der Reformation: L. G. Ricek, 599†; Skirouten-Karten: G. Freytag, 723†
Austria-Hungary—
Annexion von Ada-Kaleh durch Oesterreich-Ungarn: H. Wichmann, 461†
Maps: Artaria's Eisenbahnkarte von Oesterreich-Ungarn und den Balkanländern, 225†; Eisenbahn-Wandkarte von Oesterreich-Ungarn: G. Freytag, 724†; Neue Bahnprojekte in Oesterreich-Ungarn und den Balkanstaaten: G. Freytag, 724; Spezialkarte der österreichisch-ungarischen Monarchie: K. K. Militärgeogr. Inst., 225†, 473†; Verkehrskarte von Oesterreich-Ungarn mit den Balkländern, 1914: G. Freytag, 724†
Avelot, R., letter on Tribal Movements in Africa, 95
Awe, Loch, Syncline: E. B. Bailey, 214†
Ayun el Kasim, Arabia, 509, 510
Azzi, G., Che cosa si debba intendere per peninsola, 222†; Fenomeni della erosione . . . nel bacino del Correcchio, 100†

B.

Babcock, W. H., Early Norse visits to North America, 194§, 353†
Babinger, F., Hans Dernschwam, 472†
Backhouse, E., and J. O. P. Bland, Annals and memoirs of Court of Pekin, 464†
Bacon, G. W., & Co., Motoring and Cycling Maps, 474†, 600†, 724†; New Plan of Leeds and suburbs, 474†; Plan of Exeter and suburbs, 474†; School and College Atlas, 727†
Baedeker, K., Handbook for travellers. Egypt and the Sudan, 216†; Indien; Handbuch für Reisende, 102†
Baerlein, H., Mexico, Land of Unrest, 575§
Bailey, E. B., Loch Awe Syncline, 214†
Bailey, F. M., Note on Exploration of Tsang-po, 184*; and H. T. Morshead, Expedition to Tsang-po, 80
Bairnsfather, P. R., Sport and nature in Himalaya, 351†
Ba-Kalé, Notice historique sur les: R. Avelot, 716†

Bakongo, Among the primitive: J. H. Weeks, 593 †
Baldwin, A. L., California-Washington arc of primary triangulation, 468 †
Balearic islands—
Bau und Boden der Balearischen Inseln, 714 †
Balfour, H., remarks on "An expedition to Dutch New Guinea," 271
Balkan wars, Hellas and the: D. J. Cassavetti, 212 †, 323 §
Balkans—
Area and Population of Balkan States, before and after war of 1912–1913.. 565
Boundaries, New, of Balkan States and their significance: W. L. Joerg, 711 †
Grenzen, Neuen, der Konigreiche Serbien und Bulgarien: P. Langhans, 711 †
Kartographie der Balkanhalbinsel im 20. Jahrhundert: V. Haardt v. Hartenthurn, 711 †
Maps: Karte der Balkanhalbinsel: G. Freytag, 724 †; Staaten der Balkanhalbinsel mit Teilen von Oesterreich-Ungarn, etc.: K. Peucker, 473 †
Map of Balkan States in Accordance with Recent Treaties (note), 559
Verkehrsprobleme auf der westlichen Balkanhalbinsel: H. Grothe, 461 †
Voies ferrées transbalkaniques: A. Sauzède, 711 †
Ball, J., award to, 690; Brief note on phosphate deposits of Egypt, 352 †
Ball, V., and R. R. Simpson, Coalfields of India, 102 †
Baltic sea—
Canal scheme between Baltic and Black Seas, 578
Ostseehandel in früheren Zeiten: C. Reuter, 461 †
Sea-level, mean, in North Sea and Baltic, Variations of: — Brehmer, 335
Wasserhaushalt der Ostsee: H. Spethmann, 461 †
Wasserstande, Mittleren, der Nordsee und der Ostsee: — Brehmer, 335 §, 592 †
Baluchistan—
Balutschistan: E. Zugmayer, 714 †
Photographs of Baluchistan: E. Zugmayer, 728 †
Bamboo—
Botanische . . . Studien über die Bambusstaude: C. C. Hosseus, 471 †
Bamu river, Papua, 410
Banana Cultivation, etc.: W. Fawcett, 471 †
Bandas, Notes ethnographiques: — Gillier, 716 †
Banse, E., Am Euphrat (Dēr-Bardād, 1908), 465 †; Exploration of Libyan Desert, 444; Stand der Erforschung der Libyschen Wüste und Tibestis Anfang 1914 (map), 602 †
Bantu tribes of South-Eastern Africa, 325, 572
Barbarich, E., Cenni monografici sull' isola di Chio, 715 †
Barbary Coast: A. Edwards, 103 †
Barents sea—
Barents-Zee; iets over zeezand en grondstroomingen: A. L. W. E. van der Veen, 222 †
Barimo, Papua, 409
Barlette, H., Monographie de la région de Tiaret, 716 †
Barrett-Hamilton, G. E. H., obituary, 450
Barrows, H. H., Rooseveldt dam and Salt River Valley, 218 †
Bartholomew, J., Railway Map of British Isles, 600 †; Tourists' Map of Ireland, 600 †
Bartholomew, J. G., Comparative Atlas, Physical and Political, 361 †; Survey Gazetteer of British Isles, 350 †
Barton, W. J., On School Atlases, 424
Baschin, O., Beeinflussung der Temperatur des Meerwassers durch die Nachbarschaft von Eisbergen, 597 †; Eisberge und Schiffahrt, 721 †
Basuto—
History of Basuto, ancient and modern: F. Ellenberger and J. C. Macgregor, 192 §
Bates, O., Eastern Libyans, 594 †
Bathold, W., Geographische und historische Erforschung des Orients, 102 †
Bavaria—
Maps: Topographische Atlas von Bayern (K. B. Generalstab), 475 †, 356 †
Nordrand der mittleren Schwäbischen Alb: R. Lang, 591 †
Bayare, Nigeria, 632
Beardmore glacier, Antarctic, 622
Bear Island, Photographs of: R. C. Morrell, 480 †
Beaumont, Sir L., remarks on "Work and Adventures of Northern Party of Captain Scott's Antarctic Expedition, 1910–13," 14
Beaver, W. N., Description of Girara District, Western Papua, 407 *
Beccari, C., Rerum Æthiopicarum Scriptores occidentales inediti a sæculo xvi. ad xix., 351 †
Beckers, W. J., Bernsteinwege der Altertums, 598 †
Beckit, H. O., remarks on "Relief in Cartography," 403
Beekman, A. A., Geschiedkundige Atlas van Nederland, 357 †
Beheira—
Contoured map of Beheira Province: G. S. L. Clowes, 352 †
Bel, R., Vie fluviale dans la région de Canton, 350 †
Bell, W. G., Triangulation survey work in India, and death of, 665, 668
Bellanger de l'Espinay, L. A., Mémoires de: H. Froidevaux, 106 †
Bellet, D., Nouvelle voie maritime, Canal de Panama, 104 †

Benadir—
Carte magnetica del Benadir: L. Palazzo, 216 †
Bénévent, E., Climate of South-East France, 336
Beneyton, A., Mission d'études au Yemen, 715 †; Surveys for Railway in Yemen, 66
Benham, G. E., Journey across Central Africa, 81
Bennett, T. L., Notes on resection, 221 †
Benson, E. F., Winter Sports in Switzerland, 102 †
Benton, P. A., and A. Schultze, Sultanate of Bornu, 685 §
Beretta, M., Waterway between Milan and Venice, 440
Berget, A., Formule barométrique simplifiée pour la mesure des altitudes, 221 †; Repartition géographique des océans, etc., 222 †
Berindei, M., Nouveau territoire Roumain, 714 †
Bermudas—
Salinity of sea-water in the Bermudas, Preliminary study of: K. S. Mark, 223 †
Bertacchi, C., Geografia nella scienza, nella scuola e nella vita sociale, 722 †
Bertolini, G. L., Qualche chiarimento su l'Orbis Pictus ni Papa Zaccaria, 722 †
Besnier, M., Lexique de géographie ancienne, 224 †
Bews, J. W., Œcological survey of Midlands of Natal, 466 †, 580 §
Bieler-Chatelan, T., Formazione dei deserti e le emigrazioni umane, 722 †
Bilaphond La, Karakoram, 119, 121, 692
Bilguer, A. v., Materialen zu den Reisen von Gerhard Rohlfs und Gustav Nachtigal, 466 †
Bimberi, Mount, New South Wales, 380
Bingham, H., Discovery of Machu Picchu, 219 †; Yale University and National Geographic Society Peruvian Expedition, 676; and others, Investigation of prehistoric human remains found near Cuzco, Peru, 219 †
Binnie, Sir A. R., Rainfall reservoirs and water supply, 332 §
Birkelund, K., On cause of magnetic storms and origin of terrestrial magnetism, 471 †
Birket-Smith, K., Skærgaardsfarter i Sydgrønland, 221 †
Birmingham Country, its geology and physiography: C. Lapworth, 593 †
Birot, J., Statistique Annuelle de géographie humaine comparée, 1913.. 723 †
Bjerknes, V., and others, Dynamic meteorology und hydrography, 597 †
Blache, M. J., Note sur l'évolution du lit des cours d'eau, 721
Black sea—
Canal scheme between Baltic and Black seas, 578
Black sea—*continued.*
Railway from Armavir to Black Sea Coast, 81
Blaikie, W. B., Dr. John Watson M'Crindle, 472 †
Blanc, Mont—
Flächengliederung der Montblancgruppe: R. Lucerna, 461 †
Blanchard, M. M., Note sur commerce des céréales du Bas-Dauphiné dans le courant du XVIII^e^ siècle, 711 †
Blanchard, R., Crue glaciaire dans le Alpes de Savoie au XVII^e^ siècle, 711 †; Morphologie du Caucase, 215 †; Questionnaire d'enquêtes géographiques en montagne, 722 †
Blancke, A. C.: *see* Van Loo, R.
Blanckenhorn, M., On Pluvial period in Palestine, 162
Bland, J. O. P. (*see also* Backhouse, E.), Recent events and present policies in China, 215 †
Blayac, J., Relations des Sables des Landes avec les terrasses de Garonne, 711 †
Bloch, C., and others, Divisions Régionales de la France, 71 §
Blumentritt, F., obituary of, 211
Boa Nova, F.: *see* Crandall, R.
Bohemia—
Morphologie des nordwestlichen Böhmen: H. Rassmuss, 461 †
Böhm, A., Längsten kontinentalen und ozeanischen Erstreckungen, 470 †
Bökemann, —, Stadtanlage von Tsingtau, 714 †
Bolivia—
Bolivie et ses mines: P. Walle, 104 †
Chaco Boliviano, Guia al: F. B. de Nino, 353 †
Etnografia Chiriguana: F. B. de Nino, 353 †
Linguistique Bolivienne: G. de Crequi-Montfort et P. Rivet, 469 †, 717 †
Bollingii, F., Oost-Indisch Reisboek, 351 †
Bolshezemelsk Tundra and its nomads: S. V. Kertzell, 213 †
Bolton, J., remarks on "Relief in Cartography," 406
Bonar, H., Desert of Sinai, 106 †
Bonarelli, G., Exploración de la región petrolifera de Salta, 353 †
Borchgrave, Baron de, La Flandre et le Greenland au IX^e^ siècle, 719 †
Boreida, Arabia, 511
Borneo—
Collecting expedition to Mount Kinabalu: J. C. Moulton, 715 †
Expedition to Mount Kinabalu by J. C. Moulton, 441
Bornu—
Sultanate of Bornu: A. Schultze and P. A. Benton, 216 †, 685 §
Bosnia—
Bosnisch-herzegovinsche Bahnproblem: R. Sieger, 461 †
Bosworth, T. O., Notes on semi-arid conditions in part of Southern Texas, 468 †

Botany Bay, Beach formations at: E. C. Andrews, 220 †
Bowie, W., Determination of time, longitude, etc., 222 †
Bowman, I., Asymetrical crest-lines and abnormal valley profiles in Central Andes, 720 †; Dwarf forests of Southern California, 218 †
Bozen—
Maps: Umgebung von Bozen: G. Freytag, 723 †
Braby, H. W., Harmattan wind of Guinea Coast, 339 §, 467 †
Bradford—
Story of Bradford: M. C. Law, 71 §
Branner, J. C., Fluting and pitting of granites in the Tropics, 353 †
Braun, E., New Tripoli, 594 †
Braun, J., Vegetationsverhältnisse der Schneestufe in den Rätisch-Lepontischen Alpen, 461 †
Brazil—
Boundary Survey between Brazil and Bolivia: H. A. Edwards, 206
Colonial français oublié, Un grand effort: E. Duchemin, 718 †
Costa septentrional do Brazil na cartographia dos primeiros lustros do seculo 16: J. B. Hafkemeyer, 219 †
Geology of region about Natal, Rio Grande do Norte: O. P. Jenkins, 469 †
Granites in the Tropics, Fluting and pitting of: J. C. Branner, 353 †
Portos do Brazil: J. B. Gonçalves, 219 †
Reise durch Nord-Brasilien zum Orinoco 1911–13: T. Koch-Grünberg, 718 †
Twentieth Century Impressions of Brazil: R. Lloyd and others, 75 §
Brehmer, —, Ueber die Jahresschwankungen im mittleren Wasserstande der Nordsee und der Ostsee, 335 §, 592 †
Brennecke, W., Ozeanographische Arbeiten des Deutschen Antarktischen Expedition, 597 †
Brett, W. H., Legends and Myths of aboriginal Indians of British Guiana, 106 †
Breuvery, J. de: *see* Cadalvène, E. de.
Bride peak, Karakoram, 136
British Colonies—
Surveys of British Africa, etc., Annual Report of Colonial Survey Committee, 598 †
British Columbia—
Maps: British Columbia (Surveyor-General's Office, Victoria, B.C.), 110 †, 478 †; Mining Divisions (Dept. of Lands, B.C.), 477 †; Railway Belt (Dept. of Interior, Ottawa), 110 †, 360 †; Northern Territory, etc. (Dept. of Lands), 110 †; Pre-emptor's maps (Dept. of Lands, B.C.), 110 †, 478 †; Southern British Columbia (Dept. of Interior, Ottawa), 602 †; South-Western Districts (Dept. of Lands, B.C.), 478 †; Topographical map of Alberni and district: S. C. Weston and F. V. Longstaff, 602 †; Yale district and portion of adjacent districts (Dept. of Lands, B.C.), 478 †
Northern Cordillera (British Columbia Mountaineering Club), 104 †
British Empire—
Geography of British Empire: W. L. Bunting and H. L. Collen, 197 §
Parliamentary Papers relating to the Dominions, 1812–1911, Guide to: M. I. Adams and others, 105 †
British Isles—
Commercial geography of the British Isles: F. Mort, 472 †
Gazetteer surveys of the British Isles: J. G. Bartholomew, 250 †
Maps: Railway map: J. Bartholomew, 600 †
Plant life in British Isles, Story of: A. R. Horwood, 350 †
British Museum—
Mammals of Western Europe in collection of British Museum (Natural History), Catalogue of: G. S. Miller, 349 †
Brockedon, W., Journal of Excursions in the Alps, 106 †
Brooks, C. E. P., Meteorological Conditions of an Ice-sheet, 698 §, 720 †
Broussonet, Auguste, Voyageur oublié: H. Froidevaux, 224 †
Brown, A. S., and G. G., Guide to South and East Africa, 217 †
Brown, R, M., Ohio river floods of 1913.. 218 †
Browne, B., Conquest of Mount McKinley, 353 †, 574 §
Bruce, Hon. C. G., Kulu and Lahoul, 464 †
Bruce, W. S., remarks on "Sea-Route to Siberia," 499; and J. Mathieson, Map of Prince Charles Foreland, 113 †
Brückner, E., Moorbildungen und postglaziale Klimaschwankungen am Nordsaum der Ostalpen, 711 †; Schneegrenze in der Antarktis, 470 †
Bruun, D., and F. Hansen, Kort over Island, 108 †
Bryce, Viscount, remarks on "Some Aspects of Travel," 376
Bucharest—
Paix de Bucarest: — Thomasson, 349 †
Treaty of, 563
Buffe, W., Ueber des Festlegung von Wanderdünen in Buchara und Transkaspien, 715 †
Bukhara—
Festlegung von Wanderdünen in Buchara and Transkaspien: W. Buffe, 715 †
Bulgaria—
Frontier between Bulgaria and neighbouring States, 559, 561
Bunau-Varilla, P., Panama, the creation, destruction, and resurrection, 354 †

Bunting, W. L., and H. L. Collen, Geography of British Empire, 197 §
Burlingham, F., A descent into Crater of Vesuvius, 201
Burma—
Big game shooting in India, Burma, and Somaliland: V. M. Stockley, 74 §
British Rule, Burma under: J. Dautremer, 73 §
Journey from Myitkyina to Sadiya: B. E. A. Pritchard, 521 *
Burrard, S. G., General Report on operations of Survey of India, 1911–12..102 †; letter on Is the Earth drying up? 705; on Deflection of Plumb-line in Northern India, 692; Origin of mountains, 222 †; remarks on "Relief in Cartography," 398
Burtt-Davy, J., Maize, its history, cultivation, etc., 356 †
Rutler, B. S., Geology and ore deposits of San Francisco and adjacent districts, Utah, 469 †
Byström, H., Fotogrammetrisk Kartläggning, 221 †

C.

Cadalvène, E. de, and J. de Breuvery, L'Egypte et la Nubie, 106 †
Cahill, B. J. S., Land Map of World on new Projection, 86 §, 221 †
Cairo—
Cairo of to-day; practical guide to Cairo and Nile: E. A. Reynolds-Ball, 593 †
Caix, R., France et chemins de fer de l'Asie turque, 465 †
California—
Forests, Dwarf of Southern California: I. Bowman, 218 †
Calkins, F. C.: *see* Emmons, W. H.
Cambodia—
Monographie du Srok de Chong-Kal: E. Ricou, 464 †
Camel—
Pleistocene camel north of Arctic Circle, Notice of occurrence of: J. W. Gidley, 223 †
Campbell, glacier, South Victoria Land, 4
Campbell, R., Geology of South-Eastern Kincardineshire, 214 †
Canada—
Earthquake of April 28, 1913: O. Klotz, 467 †
Eskimo of Northern Canada, 433
Georgian Bay Ship Canal: Sir R. W. Perks, 696
Maps: Canada (Geog. Section, General Staff), 477 †; Geological Survey of Canada (Dept. of Mines), 110 †, 229 †, 360 †, 602 †, 726 †; Sectional Map (Dept. of Interior, Ottawa), 109 †, 229 †, 360 †, 477 †; Topographic map (Dept. of Militia and Defence, Ottawa), 109 †
Naval Service, Report of Department of, for 1913..717 †
Precise levelling: F. B. Reid, 467 †
Canada—*continued*.
Precise levels along Dawson and Glacier roads from White pass, B.C., to the 141st Meridian: D. H. Nelles, 467 †
Railway, Trans-Continental; Completion of Grand Trunk Pacific, 696
Visual Instruction Committee Handbooks. No. 4, Canada and Newfoundland: A. J. Sargent, 575 §
Canadian Arctic Expedition: V. Stefánsson, 85
Canals—
Canals and Internal Navigation in Russia: R. Hennig, 577
Canberra—
Evolution of a Capital, Physiographic Study of Foundation of Canberra: G. Taylor, 378,* 536 *
Maps: Relief map showing proposed Federal Capital Territory of Canberra: G. Taylor, 478 †
Meteorology, 542
Physiography and Topography, 536
Canton—
Vie fluviale dans la région de Canton: R. Bel, 350 †
Canziani, E., and E. Rohde, Piedmont, 213 †
Cape of Good Hope—
Maps: Cape of Good Hope (Geog. Section, General Staff), 358 †, 476 †, 601 †
Royal Observatory, Cape of Good Hope, History and description of: Sir D. Gill, 351 †
Cape Verde islands—
Kapverdischen Inseln, Beiträge zur Kenntnis der: I. Friedlaender, 352 †
Maps: Kapverdischen Inseln: I. Friedlaender, 361 †
Carles, W. R., 'Wissenschaftliche Ergebnisse des Expedition Filchner nach China und Tibet,' 569 §
Carlson, K. A., Forestry in relation to irrigation in South Africa, 717 †
Carmen Land, Antarctic, 609
Carne, J. E., Mercury or "Quicksilver" in New South Wales, 354 †; Notes on occurrence of coal . . . in Papua, 220 †
Carnier, K., Einige Bemerkungen über die isolierten Gebirge im Tiefland des Paraguay, 718 †; Skizzen vom paraguayischen Chaco, 718 †
Carrier, —, Une mission géodésique à Madagascar, 216 †
Carruthers, D., Maps of Mongolia and Dzungaria, letter on: W. W. Obrucheff, 708; Unknown Mongolia, 189 §
Carstenz, Mount, New Guinea, 207, 257, 265
Cartography (*see also* Maps)—
Æronautica, Per la cartografia: G. Roncagli, 719 †
Carta náutica en la Biblioteca universitaria de Valencia: R. V. Pajares, 356 †
Gegenazimutale mittabstand-treue Karte in konstruktiver und theoretischer Behandlung: C. Schoy, 719 †

Cartography—*continued.*
Relief in Cartography: H. G. Lyons, 233 *, 395 *; letter on: C. F. Close, 347
Simon van Salinghens Karta öfver Norden 1601: E. G. Palmén, 356 †
Case, G. O., Use of vegetation for reclaiming tidal lands, 105 †
Caspian sea—
Alte Verbindung zwischen dem Oxus und dem Kaspischen Meer: A. Herrmann, 464 †
Level of Caspian, Recent fall in: J. de Shokalsky, 691
Level, Oscillations of, 295, 296, 456
Cassavetti, D. J., Hellas and the Balkan Wars, 213 †, 323 §
Castañeda, Lake, Spain, and Evidences of former glaciation: W. Halbfass, 200, 714 †
Castre, E., Porvenir de la industria del jebe en el Perú, 469 †
Catalogue—
London Library, Catalogue: C. T. H. Wright and C. J. Purnell, 598 †
Cathay and the way thither: Sir H. Yule and H. Cordier, 350 †
Caucasus—
Morphologie du Caucase: R. Blanchard, 215 †
Natur- und Kulturbilder aus den Kaukasusländern und Hocharmenien: M. Rikli, 215 †
Railways, Progress of, 81
Structure géologique de chaîne de Cahetie: A. Riabinin, 215 †
Vegetationsbilder aus dem westlichen Kaukasus: M. Rikli und E. Rübel, 215 †
Ceara—
Elevações, Lista de, determinadas com o barometro aneroide: R. Crandall and others, 218 †
Celebes—
Kopfjägern in Central-Celebes: A. Grubauer, 103, †
Maps: Topographische Skizze aus dem Ostarm der Insel Celebes: G. Wanner, 601 †
Cervantes de Salazar, F., Crónica de la Nueva España, 594 †
Ceylon—
Railway Connection between India and Ceylon, 693
Chabert, J. B. de, Voyage fait . . . en 1750 et 1751 dans l'Amérique Septentionale, 106 †
Chad, Lake—
Explorations in Lake Chad Region by Commandant Tilho, 441
Level of, 298
Chamba tribe, Nigeria, 635
Chamberlain, J. F., and A. H., Continents and their people. South America, 595 †
Chamberlin, T. C., Diastrophism and formative processes, 720 †
Channel Islands—
Archipel de la Manche: C. Vallaux, 323 §
Charts, New—
Admiralty, † 113, 230, 362, 479, 603, 727
Afrique, Côte Ouest d' (Mission Hydrographique du Gabon), 363 †
Meteorological Charts: Atlantic, North, and Mediterranean (Met. Office, London), † 114, 231, 363, 479, 604; Indian Ocean (Met. Office, London), † 114, 231, 363, 479, 604
Norway. Kystkarter (Norges Geog. Opmaaling), 114 †
Pilot Charts: Atlantic Ocean (U.S. Hydrog. Office), † 114, 231, 363, 479, 604; Indian Ocean (U.S. Hydrog. Office), † 114, 231, 363, 479; Pacific Ocean (U.S. Hydrog. Office), † 114, 231, 479, 604
Russian Hydrographic Charts (Ministry of Marine), 115 †
Spitsbergen (Norges Geog. Opmaaling), 115 †
Chatham Memorial to Captain Scott and his Companions, 585
Chile—
Hydrographical Surveys: H. Steffen, 84
Nitrate de Soude du Chili: A. Verbruggen, 219 †
Nitrate fields of Chile: W. S. Tower, 354 †
Chiltern Wind-gaps, The: J. W. Gregory, 691
China—
Annals and memoirs of Court of Pekin: E. Backhouse and J. O. Bland, 464 †
Buddist China: R. F. Johnston, 102 †
China Revolutionized: J. S. Thompson, 323 §
Events, Recent, and present policies in China: J. O. P. Bland, 215 †
Expedition Filchner nach China und Tibet, Wissenschaftliche Ergebnisse des, 569 §
Expedition in western borderlands of China by Dr. Legendre, 441
Maps: Railways, telegraphs and treaty ports (Geog. Section, General Staff), 358 †
Naturalist in Western China: E. H. Wilson, 351 †
Outline history of China: H. H. Gowen, 102 †
Photographs of Southern China: M. H. P. Destelan, 364 †
Railway, in French Western China, 338
Relations and trade of China . . . during Fourteenth Century, Notes on: W. W. Rockhill, 714 †
Stadtanlage von Tsingtau: — Bökemann, 714 †
Chinese Turkestan—
Physical anthropology of Chinese Turkestan and Pamirs, Notes on: T. A. Joyce, 464 †

Chio—
Monografici sull' isola di Chio: E. Barbarich, 715 †
Chodat, R., Voyage d'études géobotaniques au Portugal, 714 †
Chubb, T., Descriptive catalogue of printed maps of Gloucestershire, 1577–1911..102 †
Chudeau, R., Zone d'inondation du Niger, 352 †
Churchill, W., Easter Island, 596 †; Polynesian wanderings, 596 †
Cianetti, E., Superficie e popolazione d'Italia, 101 †
Cicero's journey to his province of 51 B.C.: L. W. Hunter, 465 †
Cisneros, C. B., Diccionario Politico-geografico del Perú, 1909..469 †; Guia mignon de Lima, 595 †; Provincia de Lima, 595 †
Civilization—
Geographical factor in civilization: T. W. M'Cance, 471 †
Clapp, C., Contraposed shore-lines, 720 †
Clark, A. H., On deep sea and comparable faunas, 721 †; Recent Crinoids as a Guide to Abyssal Circulation of Oceans, 583
Clarke, J. P., Photographs of East Africa Protectorate, 480 †
Clarke, J. M., Origin of Gulf of St. Lawrence, 467 †
Clerget, P., Canal de Panama, 718 †
Climatology—
Bodenbildung und Klima, Beziehungen zwischen: H. Fischer, 471 †
Change of climate and its cause, etc.: R. A. Marriott, 596 †
Climatic cycles, Theory of: R. Thirlmere, 150
Geographische Verbreitung der Monatlichen Barometersch - Wankungen: W. Köppen, 720 †
Klimaprofile: K. Mahler, 720 †
Land- und Seeklima: A. Merz, 720 †
Neigungswinkels für die Erwärmung einer Berghalds, Theoretische Ermittlung des günstigsten: C. Schoy, 471 †
Volcanic dust and other factors in production of climatic changes, etc.: W. J. Humphreys, 341 §, 355 †, 471 †
Volcanoes and climate: C. G. Abbot and F. E. Fowle, 222 †
Close, C. F., letter on Relief in Cartography, 347; remarks on "Geographical Results of Nigeria-Kamerun Boundary Commission," 650
Clowes, G. S. L., Contoured map of Beheira Province, 352 †
Coasts—
Coast erosion and protection: E. R. thews, 323 §
Cochin—
Tribes and Castes: L. K. Anantha Krishna Iyer, 568 §
Cohn, L., Beobachtungen von den Admiralitätsinseln, 718 †
Cole, F.-C., Wild tribes of Davas Di[illegible], 715 †
Collen, H. L.: *see* Bunting, W. L.
Collins, H. N. W., Permanence of [illegible] graphical control over Man, 355 †
Collins, M., remarks on "Evolution [illegible] a Capital," 551
Colombia—
Columbia: P. J. Eden, 688 §
Voyage en Colombie 1911–1912: F. Serret, 575 §
Columbus—
Birthplace of Christopher Columbus, 210
Thèses nouvelles sur l'origine de Christophe Colomb: H. Vignaud, 210 §, 224 †
Verdadera Cuna de Cristóbal Colón: C. de Horta y Pardo, 224 †
Comer, G., Map of Southampton Island, Additions to, 104 †
Commerce—
Mittelalterliche Welthandel von Florenz in seiner Igeographischen Ausdehnung: E. Friedmann, 598 †
Welthandel: A. Oppel, 355 †
Congo, Belgian—
Belgian Congo: Boundaries with Portuguese territory, 205; Chemins de fer au Congo et la voie de l'Urua, Notre politique de: A. J. Wauters, 351 †: Transatlantiques dans le Bas Congo, 716 †
Congo river—
Hydrographical work in Congo basin: H. Roussilhe, 204
Mission hydrographique Congo-Oubangui-Sanga: H. Roussilhe, 204 §, 352 †
Regulation of Congo, Scheme for the: R. Thys, 443
Congo State—
Histoire de l'Etat Independant du Congo: F. Masoin, 687 §
Congress—
Tropical Agriculture, Third International Congress, 700
Constantinople, Treaty of, 561
Contenson, Baron de, Irrigation au sud des Pyrénées, 714 †
Continental Islands. Johnston's Land Form Pictures, 603 †
Conway, Sir M., remarks on "Exploration of Siachen or Rose Glacier," 147
Conyngham, G. P. L., note on name Saltoro, 692
Cook—
Captain Cook's observation mark at Matavai, Tahiti, Photograph of: B. G. Corney, 364 †
Cook, R. J., and Hammond, Map of Railways of London and Suburbs, 357 †
Cook islands—
Atiu Island, Some notes on: J. T. Large, 220 †
Copeland, M. T., Cotton Manufacturing Industry of the United States, 433 §
Cora, G., Cartografica coloniale dell Istituto Geografico Militare, 716 †

Cordier, H., Yule's 'Cathay and the way thither,' edited by, 350 †
Cordillera Vilcabamba, Peru, 677
Corinth—
Histoire géologique pliocène et quaternaire du golfe et de l'isthme de Corinthe, Observations sur: C. Depéret, 350 †
Corney, B. G., Photograph of Captain Cook's observation mark at Matavai, Tahiti, 364 †; Quest and occupation of Tahiti by emissaries of Spain during 1772–1776..596 †
Cornish, V., obituary of D. D. Gaillard, 211; Waves of sand and snow, 355 †
Coropuna—
Ascent, First, of stately Coropuna: A. S. Peck, 595 †
Correard, A.: *see* Savigny, J. B.
Corry, F. A., Photographs of Peru, 364 †
Cory, G. E., Rise of South Africa, 352 †
Cossar, J.: *see* Herbertson, A. J.
Costanzi, G., Distribuzione della gravità in Europa, 349 †
Cotter, E., letter on Desiccation of Eurasia, 458
Cotton—
Cotton industry of Uganda, 594 †
Cotton manufacturing industry of the United States: M. T. Copeland, 433 §
"Dry farming" e la coltura del cotone nella Laguna di Torreon al Messico: Baron C. Aliotti, 217 †
Effect of water on cultivation of cotton (Egypt Survey Dept.), 352 †
Cotton, C. A., Tuamarina valley, 220 †
Cowan, Lake, Westralia, 662
Cradock, South Africa, Tidal phenomena at Inland boreholes near: A. Young, 82
Craig, J. I. (*see also* Willcocks, Sir W.), Rains of Nile Basin and Nile Flood of 1911..352 †
Crandall, R., and others, Lista de elevações, determinadas com o barometro aneroide, 218 †
Craster, J. E., Pemba, Spice Island of Zanzibar, 432 §
Crater Lake National Park—
Maps: Panoramic View of Crater Lake National Park, Oregon (Dept. of Interior), 111 †
Créqui-Montfort, G. de, and P. Rivet, Les dialectes Pano de Bolivie, 469 †; Linguistique Bolivienne. Langue Kaničana, 717 †
Crete—
Camping in Crete: A. Trevor-Battye, 100 †, 323 §
Crinoids, Recent, as a Guide to Abyssal Circulation of Oceans: A. H. Clark, 583
Crossland, C., Desert and Water Gardens of Red Sea, 103 †, 327 §
Csoma de Körös, A., and E. D. Ross, Tibetan Studies, 216 †
Cuba—
Sturmkatastrophen auf Kuba und Florida, 1910: W. Krebs, 469 †
Cureau, A., Sociétés Primitives de l'Afrique Equatoriale, 572 §
Curtis, G. C., Fishing-banks off our Atlantic Coast, 218 †
Curzon, Earl, Letter on Sir E. Shackleton's proposed Antarctic Expedition, 177; remarks on: "Evolution of a Capital," 550, 553; "Expedition to Dutch New Guinea," 268; "Exploration of Siachen or Rose Glacier," 142; "Is the Earth drying up?" 313; "Sea Route to Siberia," 498; "Some Aspects of Travel," 375, 377; "Work and Adventures of Northern Party of Captain Scott's Antarctic Expedition 1910–13," ..14
Cuzco—
Gravels at Cuzco: H. E. Gregory, 219 †
Prehistoric human remains found near Cuzco, Peru, in 1911, Investigation of: H. Bingham, 219 †
Vertebrate remains in the Cuzco gravels: G. F. Eaton, 219 †
Cyprus—
Griechische Sitten und Gebräuche auf Cypern: H. Ohnefalsch-Richter, 102 †
Cyrenaica—
Cirenaica (Tripolitania): G. Haimann, 106 †
Climatic changes, 168
Czirbusz, G., letter on Geography of National Culture, 96; Quellgebiet des Warmen Szamos, 592 †

D.

Daghestan—
Island in sea of history. Highlands of Daghestan: G. Kennan, 464 †
Dahana, Arabia, 506
Dainelli, G., Survey work in Central Asia, 674; and others, Materiali per la conoscenza del Mediterraneo, 223 †
Dakka pagan tribes, Nigeria, 634
Dallimore, W., Forestry in Switzerland, 335
Dalmatia—
Vegetationsbilder aus Dalmatien: L. Adamović, 461 †
Daly, R. A., Igneous rocks and their origin, 597 †
Dannies, H., Gezeiten von Ragusa, St. Andrea und Pelagosa, 460 †
Darlington, W. M., Christopher Gist's Journals, 106 †
Darton, N. H., Buried valley of Susquehanna river, Pennsylvania, 717 †
Darwin, L., remarks on: "Antarctica and some of its Problems," 627, 629; "Geographical Results of Nigeria-Cameroun Boundary Commission," 648
Dauphiné—
Commerce des céréales du Bas-Dauphiné dans le courant du XVIII[e] siècle, Note sur: M. M. Blanchard, 711 †

Dautremer, J., Burma under British Rule, 73 §
David, T. W. E., Antarctica and some of its Problems, 605 *; Observations in South Magnetic Pole area, 470 †; remarks on "An expedition to Dutch New Guinea," 272
Davis, W. M., Age of the Earth, 720 †; Geographical pilgrimage from Ireland to Italy, 225 †; remarks on "Relief in Cartography," 401
Davison, C., Earthquakes and the Panama Canal, 62 *; Recent Volcanic Earthquakes, 678 *; Sound phenomena of British earthquakes, 722 †
Dawson—
  Precise levels along Dawson and Glacier roads from White Pass to 141st Meridian: D. H. Nelles, 467 †
Dead sea—
  Level of Dead Sea, Summary of observations on rise and fall of: E. W. G. Masterman, 79 §, 465 †
De Agostini, G., Calendario Atlante, 478 †
Debenham, F., remarks on "Antarctica and some of its Problems," 627
Decouvdemanche, J. A., Note sur l'estimation de la longueur du degré terrestre par les Babyloniens, 221 †
Deladrier, E., and M. Robert, Quelques notes sur les Kundelungu, 465 †
Delafosse, M., Traditions historiques et légendaires du Soudan occidental, 716†
De la Valette, L. B., Au Canal de Panama, 354 †
Delingette, G., Carte Générale de l'Afrique Équatoriale Française, 109 †
Denali (McKinley), Mount, Ascent by Archdeacon Stuck and H. P. Karstens, 83
Dengel, P., Frage nach dem Autor der verschollenen "Mappa Mundi" im Palazzo di Venezia in Rom aus dem Quattrocento, 598 †
Denis, P., Sierra de la Lumbrera, 717 †
Denmark—
  Danske Havne-Lods: (K. Sökort-Arkiv), 349 †
Denucé, J., Bibliographie Antarctique, 719 †; Le 400e anniversaire de la naissance de Gérard Mercator, 722 †
Depéret, C., Observations sur l'histoire géologique pliocène et quaternaire du golfe et de l'isthme de Corinthe, 350 †
Dernschwam, Hans, Ein Kleinasienforscher des 16. Jahrhunderts: F. Babinger, 472 †
Derwentwater, Floating island of, 582
Desert, Conquest of the: W. MacDonald, 685 §
Desgodins, A., Mission du Thibet, 350 †
Desiccation of Eurasia and some General Aspects of Desiccation: P. Kropotkin, 451
Desolation Island, Straits of Magellan, Survey by W. S. Routledge, 446
Destelan, M. H, P., Photographs of South China, 364 †
Detzner, H., Karte des Triangulationsnetzes der Yola-Crossschnellen-Grenzexpedition, 360 †; Nigerische Grenze von Kamerun zwischen Yola und dem Cross-Fluss, 716 †
Dewar, A., letter on a hitherto unknown tribe in German East Africa, 588
De Wilde, B., Voies de communication dans la Mongolie intérieure, 714 †
Diastrophism and formative processes: T. C. Chamberlin, 720 †
Dibang Exploration Survey, Photographs taken during: C. P. Gunter, 115 †
Dick, J., From the Mein Telegraph Station to Lloyd's Bay, etc., 354 †
Dickson, H. N., obituary of Sir J. Murray, 585; remarks on "Is the Earth drying up?" 315
Dictionary—
  Etymological dictionary of English Language: W. W. Skeat, 598 †
Digul river, New Guinea, 207
Dinaric lands—
  Verbreitung der Holzgewächse in den Dinarischen Ländern: L. Adamović, 349 †
Dinse, P., History of Ptolemy's Maps, 566
Distance measurement—
  Schrittmass und seine Umwandlung in Metermass: H. Löschner, 470 †
Domin, K., Vegetationsbilder aus Java, 464 †
Dominian, L., Distribution of mineral products and railways of Asia Minor (map), 475 †
Donga river, Nigeria, 638
Douglas, Sir R. K., Europe and the Far East, 1506–1912. .74 §
Dove, K., Afrika und die Europäer, 715 †
Dracopoli, I. N., Award to, 690; Through Jubaland to Lorian Swamp, 593 †
Dresden—
  Festbericht. Das fünfzigjährige Jubiläum des Vereins für Erdkunde zu Dresden, 599 †
Drygalski, E. von, Deutsche Südpolar Expedition, 1901–1903, .105 †
Drygalski ice barrier tongue, Antarctic, 617
Dubois, M., and J. G. Kergomard, Afrique Physique et Politique (Map), 601 †
Duchemin, E., Un grand effort colonial français oublié, 718 †
Dudley, C. R., Deductive Exercises in geography: Europe, 198 §
Dugmore, A. A. R., Romance of Newfoundland caribou, 104 †
Dunes—
  Genetic system of sand dunes: M. Haltenberger, 222 †
Dunwoody, R. B., Inland water transport, 714 †
Durance river, Project for Regulation of: M. Wilhelm, 78

Dust-falls—
Atlantic, North-East Trades and, dust-falls in: G. Hellmann, 87
Dyaks of Borneo, 250
Dyngjufjöll volcano, Iceland, 679
Dzungaria—
Maps of Mongolia and Dzungaria by Mr. Carruthers, letter on: W. W. Obrucheff, 708

E.

Eakin, H. M., Geologic reconnaissance of a part of Rampart Quadrangle, Alaska, 353 †
Earn, Loch—
Temperature observations: E. M. Wedderburn, 214 †
Earth—
Achsenschwankungen der Erde als Ursache der Auslösung von Erdbeben: R. Spitaler, 471 †
Age of the Earth: W. M. Davis, 720 †
Desiccation of parts of, 451
Eiszeiten und Polschwankungen der Erde: R. Spitaler, 720 †
Interno della terra, Più recenti cognizioni e ipotesi sulle condizioni dell': G. Ricchieri, 355 †
Is the Earth drying up? J. W. Gregory, 148 *, 293 *; letter on: P. Kropotkin, 451; letter on: S. G. Burrard, 705
Journey to Earth's interior: M. B. Gardner, 472 †
Terre, La, sa forme et ses dimensions: C. Lallemand, 355 †
Earth-Dimensions—
Längsten kontinentalen und ozeanischen Erstreckungen: A. Böhm, 470 †
Earthquakes—
Location of earthquakes, On proper map for determining: W. L. Joerg, 223 †
Nomographische Bestimmung der Epizentrums: E. Rudolph und S. Szirtes, 598 †
Panama Canal, Earthquakes and the: C. Davison, 62 *
Philippine Islands, Earthquakes in the: M. Saderra Maso, 695
Rainfall, Earthquakes and: R. W. Sayles, 223 †
Recent Volcanic Earthquakes: C. Davison, 678 *
Sound-phenomena of British Earthquakes: C. Davison, 722 †
Tiefenbestimmung von Erdbebenherden: E. Rosenthal, 722 †
East Indies, Dutch—
Oost-Indisch Reisboek: F. Bollingii, 351 †
Easter island—
Easter Island: W. Churchill, 596 †
Observaciones meteorológicas de la Isla de Pascua: W. Knoche, 354 †
Eaton, G. F., Vertebrate remains in Cuzco gravels, 219 †
Eckert, M., Eisenvorräte der Erde, 472 †
Ecuador—
Ancient and modern history, etc: C. R. Enock, 595 †
Eden, P. J., Colombia, 688 §
Edwards, A., Barbary Coast, 103 †
Edwards, F. A, Firth's 'Archæological Survey of Nubia,' 324 §
Edwards, H. A., Brazil-Bolivia Boundary Survey, 206
Egeri, Lake, Evaporation from, 79
Eggert, —, Theorie und Anwendung der Drehwage von Eötvös, 721 †
Egidi, V. M., Vita dei Mekeo nella Nuova Guinea, 220 †
Egypt—
Climatic changes, 163
Cotton, Effect of water on cultivation of (Survey Dept.), 352 †
Egypt in transition: S. Low, 465 †, 687 §
Egypte et la Nubie: E. de Cadalvène et J. de Breuvery, 106 †
Expedition nach Aegypten zur Erforschung der Darstellungen der Fremdvölker, Bericht über eine: E. Meyer, 466 †
Geografia dell' Africa orientale: E. Schiaparelli, 352 †
Handbook for Travellers: Egypt and the Sudan: K. Baedeker, 216 †
Irrigation, Egyptian: Sir W. Willcocks and J. I. Craig, 216 †, 573 §
Maps: Topographical Maps of Egypt (Egyptian Survey Dept.), 227 †, 476 †, 601 †
Phosphate deposits of Egypt, Brief note on: J. Ball, 352 †
Photographs of Thebes: Miss M. S. Johnston, 729 †
Eirich, C. G., Establishing of Ohio-Michigan boundary line, 595 †
Ekman, S., Studien über die marinen Relikte der nordeuropäischen Binnengewässer, 592 †
Elbert, J., Geosynklinale und Rahmenfaltung . . . im australasiatischen Archipel, 464 †
Eldridge, T. J., Fire by friction of bush branches, 448
Elgee, F., Moorlands of North-Eastern Yorkshire, 321 §
Elgon mountain, Photographs taken of Crater Lake: G. Harley, 729 †
Ellenberger, F., and J. C. Macgregor, History of Basuto, ancient and modern, 192 §
Elmendorf, D. L., Camera Crusade through the Holy Land, 74 §
Elwin, E. F., India and the Indians, 74 §
Emigration—
Formazione dei deserti e le emigrazioni umane: T. Bièler-Chatelan, 722 †
Emmons, W. H., and F. C. Calkins, Geology and ore deposits of Philipsburg Quadrangle, Montana, 468 *

Energy, Natural sources of: A. H. Gibson, 223 †, 576 §
Engell, M. C., Anthropogeographische studien aus Grönland, 470 †
England—
Anglo-Saxon Settlements, Archæology of: E. T. Leeds, 102 †, 322 §
Coast Erosion and Protection: E. R. Mathews, 323 §
Shore protection by artificial planting: F. W. Oliver and E. J. Salisbury, 577
England and Wales—
Maps: Bacon's Motoring and Cycling Maps, 474 †; Geographia Two miles to One inch map, 474 †; Ordnance Surveys, 225 †, 357 †, 473 †, 599†, 724 †
English language, Etymological dictionary of: W. W. Skeat, 598 †
English travellers of the Renaissance: C. Howard, 356 †
Enock, C. R., Ecuador: its ancient and modern history, etc., 595 †; Republics of Central and South America, 434 §
Eredia, F., Variazione di urna della temperatura in Italia, 100 †
Erosion—
Coast Erosion and Protection: E. R. Mathews, 323 §
Wearing down of the rocks: J.W. Evans, 720 †
Eskimo—
My life with the Eskimo: V. Stefánnson, 220 †, 432 §
Etna—
Acque sotterranee dell' Etna dalle precipitazioni atmosferiche, Sulla independenza delle: G. Ponte, 101 †
Eruption and earthquake of May, 1914 ..679, 691
Euphrates—
Am Euphrat (Dēr-Bardād 1908): E. Banse, 465 †
Hindie Barrage, Geographical features, 415
Schiffahrt auf Euphrat und Tigris: J. Grassmann, 465 †
Eurasia—
Desiccation of Eurasia and some General Aspects of Desiccation, letter on: P. Kropotkin, 451
Desiccation of Eurasia, letters on: J. W. Gregory and E. Cotter, 458, 459
Europe—
Climatic changes, 169
Continent of Europe: L. W. Lyde, 68 §
Deductive Exercises in Geography. Europe: C. R. Dudley, 198 §
Far East, Europe and the, 1506—1912: Sir R. K. Douglas, 74 §
Gravità in Europa, Distribuzione della: G. Costanzi, 349 †
Holzgewächse in den' Dinarischen Ländern, Verbreitung der: L. Adamović, 349 †
Klimatvariationer i Europa under historisk tid och deras orsaker: O. Pettersson, 711 †
Mammals of Western Europe in collection of British Museum, Catalogue of: G. S. Miller, 349 †
Maps: Carte geologique internationale de l'Europe, 474 †; Generalkarte von Mitteleuropa: (K. u. K. Militärgeographisches Institut), 107 †, 226 †, 600 †, 725 †; School Wall Maps: J. C. Rothaug, F. Umlauft, H. Hassinger, 725 †; Uebersichtskarte von Mittel-europa (K. Preuss. Landesaufnahme), 226 †, 475 †; Wandtafeln zur Geographie Europas: R. Rothaug, 725 †
Marinen Relikte der nordeuropäischen Binnenengewässer: S. Ekman, 592 †
Moorbildungen und postglaziale Klimaschwankungen am Nordsaum der Ostalpen: E. Brückner, 711 †
Wasserscheiden der europäischen Binnenschiffahrt: R. Hennig, 711 †
Westeuropa als alter Kulturkreis: C. Schuchhardt, 593 †
Evans, A. H., and others, Philip Lutley Sclater, 472 †
Evans, J. W., Wearing down of rocks, 720 †
Ewing, J.: *see* Adams, M. I.
Exeter—
Maps: Plan of Exeter and suburbs: G. W. Bacon & Co., 474 †
Eylert, T., Oberflächentemperaturen im südlichen Atlantischen und im südöstlichen Stillen Ozean, 597 †

F.

Fairgrieve, J., Notes and directions for use of Philips' model set of surveying apparatus for schools, 105 †
Falconer, J. D., Classification of land forms and landscapes, 424
Falkenstein, F., Typen der Verkehrslagen am Meer, 722 †
Falkland Islands: W. J. Roper, 354 †
Fallex, M., Maroc (Map), 476 †
Fannich Mountains, Geology of: B. N. Peach and others, 714 †
Farabee, W. C., Amazon expedition sent out by University Museum, 468 †
Farrar, J. P., First ascent of Finsteraarhorn, 461 †
Faucher, M. D., Note sur terrasses de la plaine de Valence, 711 †; Site de Valence, 711 †
Fawcett, C. B., On teaching of cycle of land forms, 225 †
Fawcett, W., Banana, its cultivation, etc., 471 †
Fenton, E. G., Notes on recent pampa and other formations in Patagonia, 469 †
Fergana—
Geological construction of East Fergana: D. Mushketoff, 215 †

Feruglio, G., Primi risultati di esperienze con gattegianti par lo studio delle correnti del mare Adriatico, 222 †; Termometro a rovesciamento Richter e tavole per la sua correzione, 223 †
Fewkes, J. W., Great stone monuments in history and geography, 355 †
Ficker, H. v., Temperaturdifferenz zwischen freier Atmosphäre und Berggipfeln, 356 †
Filchner, W., Wissenschaftliche Ergebnisse des Expedition Filchner nach China und Tibet, 569 §
Filippi, F. de, Expedition in Central Asia, 32 *, 672 *
Finch, R. J., Questions and Exercises in Geography, 576 §
Finland—
  Finlande aux mille lacs: J. Leclercq, 349 †
Finsteraarhorn—
  Ascent, First, of Finsteraarhorn: J. P. Farrar, 461 †
Fiords—
  Nature and Origin of Fiords: J. W. Gregory, 329 §
Fire by Friction in branches of bushes: T. J. Eldridge, 448
Firth, C. M., Archæological Survey of Nubia, 324 §
Fischer, H., Beziehungen zwischen Bodenbildung und Klima, 471 †
Fischer, J., History of Ptolemy's Maps, 566
Fish—
  Talassobiologia e la pesca: B. Grassi, 223 †
Fitchett, W. H., New World of the South, 220 †
Fleury, E., Contribution à la connaissance de la nature des eaux minérales, 222 †
Flinders, M., Work of, in Port Phillip: T. W. Fowler, 220 †
Floating Islands: S. Powers, 582 §, 720 †
Florida—
  Discovery of Florida by Juan Ponce de Leon: L. D. Scisco, 340
  Sturmkatastrophen auf Kuba und Florida, 1910: W. Krebs, 469 †
Fly river, Papua, Exploration of, 208, 407
Forbes, H. O., obituary of A. R. Wallace, 88; remarks on "An expedition to Dutch New Guinea," 270
Forests—
  Forests and water in light of scientific investigation: R. Zon, 720 †
  Geographische . . . Bedeutung des Waldes, etc.: F. Schmid, 720 †
Foureau, F., obituary, 587
Fourgous, J., Vallée préhistorique de France, 349 †
Fowle, F. E.: *see* Abbott, C. G.
Fowler, T. W., Work of Captain Matthew Flinders in Port Phillip, 220 †
France—
  Alpes de Savoie au XVII^e siècle, Crue glaciaire dans: R. Blanchard, 711 †
France—*continued.*
  Climate of South-East France: E. Bénévent, 336
  Dépôt Général de la Guerre, Memorial du, Vol. 9. Nouvelle description géometrique de la France: E. Paytier, 107 †
  Divisions Régionales de la France: C. Bloch and others, 71 §
  Géographie Illustrée: P. Jousset, 71 §
  Hydrauliques du bassin de l'Isère, Utilisation des forces: P. Lévy-Salvador, 711 †
  Hydrauliques, Service d'Études des Grandes Forces (Ministère de l'Agriculture), 186 §
  Maps: Carte de France (Ministre de l'Intérieur), 107 †, 475 †; Carte de France et des Frontiers (Service Géo. de l'Armée), 108 †; Carte Michelin, 357 †
  Rivers of France and Supply of Water Power, 186
  Route du Lautaret, Étude géographique et historique sur la: D. M. Vaughan, 711 †
  Sables des Landes avec les terrasses de la Garonne, Relations des: J. Blayac, 711 †
  Vallée préhistorique de France: J. Fourgous, 349 †
Frank, J., Aviens "Ora maritima" und ihr Wert für das entwicklungsgeschichtliche Studium der Mittelmeerküsten Frankreichs und Spaniens, 592 †
Franklin, T., and E. D. Griffiths, Atlas Geographies. Book II. Junior Geography, 197 §; Part III. Senior Geography, 356 †
Fraser, A. Z., Livingstone and Newstead, 77 §
Fraser, D., Winning a primitive people, 104 †, 328 §
Frech, F., and F. Kampers, Schlesische Landeskunde, 100 †
French colonies—
  Histoire des Colonies Françaises Société de l'. Jean Law de Lauriston. Mémoire sur quelques affaires de l'Empire Mongol, 1756–1761..593 †
Freshfield, D. W., Hannibal once more, 679 §
Freytag, E., Eisenbahn-Wandkarte von Oesterreich-Ungarn, 724 †; Karte der Balkan-Halbinsel, 724 †; Karte des Fürstentums Albanien, 724 †; Karte des Politischen und Schulbezirkes Karlsbad, 723 †; Karte der Umgebung von Bozen, 723 †; Neue Bahnprojekte in Oesterreich-Ungarn und den Balkenstaaten. 724 †; Skircuten-Karten (Maps), 723 †; Verkehrskarte von Oesterreich-Ungarn mit den Balkländern 1914..724 †; Verkehrsplan der k.k. Reichshaupt und Residenzstadt Wien, 723 †
Friederici, G., Melanesian Migrations, 698

Friedlaender, I., Beiträge zur Kenntnis der Kapverdischen Inseln, 352†; Kapverdischen Inseln (maps), 361†
Friedmann, E., Mittelalterliche Welthandel von Florenz in seiner geographischen Ausdehnung, 598†
Frind, H. O. Photographs of North island New Zealand, 115†; Photographs of West Coast of Vancouver Island, 116†
Fritsché, E., La Transhumance, 722†
Froidevaux, H., Mémoires de L. A. Bellanger de l'Espinay, 106†; Un voyageur oublié, Auguste Broussonet, 224†
Fulani tribe, Nigeria, 632
Fuller, M. L., New Madrid Earthquake, 192§
Fürchtenicht-Boening, H., Beitrage zur physikalischen Geographie und Siedlungskunde des Schleswig Holsteinischen Sandr- (Geest-) Gebietes, 591†
Furguson, D., Geology of South Georgia, 719†
Fyfe, H. H., Real Mexico, a study on the spot, 594†

G.

Gabun—
Mission hydrographique du Gabon: — Audoin, 352†
Positions, Determination of: — Le Terrier, 443
Gaillard, D. D., obituary of, 211
Gaima district, Papua, 407
Galicia—
Rias von Galicien, ihr Werden und Vergehen: E. Scheu, 592†
Gardiner, J. S., Agassiz' 'Letters and Recollections of Alexander Agassiz,' 437§; Crossland's 'Desert and Water Gardens of Red Sea,' 327§
Gardner, M. B., A journey to Earth's interior, 472†
Garwood, E. J., Arctic glaciers and British ice-sheets, 721†
Gassner, G., Uruguay, 596†
Geer, S. De Hafsvattnets slamhalt inom Spetsbergens Isfjord ur geografisk Synpunkt, 719†
Geest, E. de, Het Koninkrijk der Nederlanden, 358†
Geikie, J., Mountains, their origin, growth, and decay, 222† 689§
Gentil, E., obituary, 704
Geodesy—
Elementary geodesy, Practical survey and: H. Adams, 221†
Estimation de la longueur du degré terrestre par les Babyloniens: J. A. Decouvdemanche, 221†
Geoid und Erdellipsoid: F. R. Helmert, 470†
Geoids, Bestimmung des, im Gebiete des Harzes: F. R. Helmert, 591†
Geographer and History: E. Huntington, 19*
Geographical Association, Annual Meeting, 1914..419
Geographical Congress—
Internationalen Geographenkongresse, Zukunftige Gestaltung der, 599†
Geographical Education, Thirty Years' Progress in: J. S. Keltie, 419
Geographical Literature of Month—
Africa, 103, 216, 351, 465, 593, 715
America, 104, 217, 353, 467, 594, 717
Anthropogeography and Historical Geography, 223, 355, 471, 598, 722
Asia, 102, 215, 350, 464, 593, 714
Australasia and Pacific Islands, 104, 220, 354, 469, 596, 718
Biography, 224, 356, 472, 598, 722
Europe, 100, 213, 349, 460, 591, 710
General, 105, 225, 356, 472, 598, 722
Mathematical Geography, 221, 470, 596, 719
Physical and Biological Geography, 105, 222, 355, 471, 596, 720
Polar Regions, 105, 220, 355, 470, 596, 719
Geographical Names—
Trascrizione dei nome geografiche al X. Congresso Internazionale di Geografia 1913, Rapporto della Commissione per la: G. Ricckieri, 722†
Geographical pilgrimage from Ireland to Italy: W. M. Davis, 225†
Geographical Society, American, Cooperation with Association of American Geographers, 449
Geography—
Animal Geography: M. I. Newbigin, 197§
Atlas Geographies; new visual atlas and geography combined: T. Franklin and E. D. Griffiths, 197§, 356†
British Empire, Geography of: W. L. Bunting and H. L. Cullen, 197§
Caractères distinctifs de la géographie: P. Vidal de la Blache, 722†
Cinquecento, Geografia nel: P. Revelli, 722†
Commercial geography, Elementary: H. R. Mill, 472†
Commercial geography of British Isles: F. Mort, 472†
Commercial geography of the World. Part II. A. J. Herbertson and J. Cossar, 105†, 439§
Commercial Geography of World: O. J. R. Howarth, 197§
Comparative geography of six continents: E. W. Heaton, 576§
Deductive exercises in geography; Europe: C. R. Dudley, 198§
Documents cartographiques de géographie économique: G. Michel et C. Knapp, 722†
Geografia nella scienza, nella scuola e nella vita sociale: C. Bertacchi, 722†
Handbook of Geography: J. Herbertson, 105†

Geography—*continued.*
Higher units: A. J. Herbertson, 723 †
Historical Geography of Scotland: W. R. Kermack, 428 §
Lexique de géographie ancienne: M. Besnier, 224 †
National Culture, Geography of, letter on: G. Czirbusz, 96
Oxford Geographies. World and its discovery: H. B. Wetherill, 599 †
Physical. Traité de géographie physique: E. de Martonne, 223 †
Physikalischen Geographie, Experiment in der: K. Sapper, 598 †
Physiogeographie und Vergleichende Landschaftsgeographie: S. Passarge, 598 †
Place-names in teaching of geography, Use of: J. A. Ramsay, 225 †
Preliminary geography: E. G. Hodgkinson, 576 §
Questions and exercises in Geography: R. J. Finch, 576 §
Scholar's geographical exercise book: W. & A. K. Johnston, 472 †
Science, New, of Geography: E. Huntington, 722 †
Scotland, Elementary Geography of: M. I. Newbigin, 197 §; Geography in Scotland since 1889: M. I. Newbigin, 593 †
Stone monuments, Great, in history and geography: J. W. Fewkes, 355 †
Summer Schools in Geography at Aberystwyth and Whitby, 584
Teaching geography, Principles and methods of: F. Holtz, 105 †, 438 §
Teaching of geography and history as a combined subject: H. J. Mackinder, 225 †
Text-book of geography: R. M. Munro, 199 §
Geological History—
Paläogeographische Bedeutung Sedimentpetrographischer Studien: K. Andrée, 471 †
Geology—
Hints on collecting geological information and specimens: G. W. Grabham and S. E. Dunn, 720 †
Structural geology: C. K. Leith, 597 †
Geomorphology—
Abhängigkeit der Form der Landoberfläche vom inneren Bau: A. Hettner, 471 †
Mittelmeerische Gürtel und seine erdgeschichtliche Bedeutung: T. Arldt, 720 †
Geopsychologie: A. Rühl, 471 †
George, Lake, New South Wales, 389, 536
Georgian Bay Ship Canal: Sir R. W. Perks, 695
Germi, G. E., obituary, 94
Germain, L., Problème de l'Atlantide et la zoologie, 222 †
Germany—
Bergbach des Sauerlandes: A. Thienemann, 591 †
Deutschen Grossstädte: K. Olbricht, 592 †
Erdfall bei Hopsten vom 14. April, 1913: T. Wegner, 591 †
Fossile Sund- und Strömungsrinnen im Kustengebiet Vorpommerns: H. Spethman, 591 †
Gebietsaustausch zwischen dem Grossherzogtum Sachsen und dem Herzogtum Sachsen-Meiningen vom 1 Jan., 1913..591 †
Maps: Karte der für Luftfahrzeuge verbotenen Zonen, 108 †; Karte des Deutschen Reiches (K. Preuss. Landesaufnahme), 475 †; Schnellzugskarte des Deutschen Reiches: H. V. Hedemann, 600 †
Seeverkehr in den deutschen Hafenplätzen; G. Goldberg, 591 †
Ghani, Abdul, A visit to Jarabub Oasis, 338
Gibson, A. H., Natural sources of energy, 223 †, 576 §
Gidley, J. W., Notice of occurrence of a pleistocene camel north of Arctic Circle, 223 †
Gill, Sir D., History and description of Royal Observatory, Cape of Good Hope, 351 †; obituary, 344
Gillier, —, Les Bandas, Notes ethnographiques, 716 †
Girara District, Western Papua, Description of: W. N. Beaver, 407 *
Gironcourt, G. de, De l'Ardrar au Cameroun, 217 †
Gist, Christopher, Journals of: W. M. Darlington, 106 †
Glaciers—
Arctic glaciers and British ice-sheets: E. J. Garwood, 721 †
Moraine-streams, Characteristics of, 279–286
Refrigeratrice dei ghiacciai, Sull' azione: V. Monti, 222 †
Sérac-penitente formations, 290
Variations périodiques des glaciers: C. Rabot et P. L. Mercanton, 721 †
Vitesse des glaciers en hiver, etc: J. Vallot, 222 †
Gloucestershire—
Maps of Gloucestershire, 1577–1911, Descriptive catalogue: T. Chubb, 102 †
Goldberg, G., Seeverkehr in den deutschen Hafenplätzen, 591 †
Goebel, O., Vom Ural bis Sachalin, 351 †
Gold Coast—
Gross-Friedrichsburg, Neue Forschungen über: O. Voigt, 716 †
Goldschlag, M., Zur Petrographie Paraguays und Matto Grossos, 718 †
Gonçalves, J. B., Portos do Brazil, 219 †
Gordonia, South Africa, 686
Gore, St. G. C., obituary of, 92

Gowen, H. H., Outline History of China, 102 †
Gowjagin, A. M., Wall map of Asiatic Russia, 725 †
Grabham, G. W., and S. W. Dunn, Hints on collecting geological information and specimens, 720 †
Graham, S., With the Russian pilgrims to Jerusalem. 351 †
Grant, U. S., and D. F. Higgins, Coastal glaciers of Prince William Sound and Kenai Peninsula, 353 †
Grassi, B., Talassobiologia e la pesca, 223 †
Grassmann, J., Schiffahrt auf Euphrat und Tigris, 465 †
Great Lakes—
Glacial and post-glacial lakes of Great Lakes region: F. B. Taylor, 467 †
Greece—
Climatic changes, 164
Frontier between Bulgaria and Greece, 559
Hellas and the Balkan Wars: D. J. Cassavetti, 213 †, 323 §
Physical features, Influence of, on characters of Greeks, 20
Greeks, Scythians and: E. H. Minns, 76 §
Greenland—
Ammassalik Eskimo: W. Thalbitzer, 719 †
Anthropogeographische Studien aus Grönland: M. C. Engell, 470 †
Climatic changes in, 303
Danmark-Ekspeditionen til Grønlands Nordøstkyst. 1906–1908: L. Mylius-Erichsen and others, 470 †; Hydrographical Observations: A. Trolle, 195 §, 223 †
Flandre et le Greenland au IXe siècle: Baron de Borchgrave, 719 †
Ice-cap of, 452
Ice conditions in 1912..209
Oversigt over Meddelelser om Grønland 1876–1912: T. Kornerup, 719 †
Quer durch Grönlandeis: A. de Quervain, 221 †, 689 §
Skærgaardsfarter i Sydgrønland: K. Birket-Smith, 221 †
Gregory, H. E., Geographical sketch of Titicaca, 219 †; Geologic sketch of Titicaca Island, 469 †; Gravels at Cuzco, Peru, 219 †; La Paz (Bolivia) Gorge, 218 †
Gregory, J. W., Geological relations of South Georgia, 719 †; Is the Earth drying up? 148 *, 293 *; Lake System of Westralia, 656 *; letter on Prince Kropotkin's views of desiccation of Eurasia, 458; Nature and Origin of Fiords, 329 §; obituary of Eduard Suess, 701; The Chiltern Wind-gaps, 691
Grein, K., Ein Meeres-photometer, 471 †
Grenoble, Étude géographique d'une rue: C. A. Roux, 711 †
Gribaudi, P., I progressi dell' agricoltura Argentina, 717 †
Griffiths, E. D.: *see* Franklin, T.
Groll, M.: *see* Sprigade, P.
Gross, A., "Geographia" Two miles to one inch map of England and Wales, 474 †
Grotewold, C.: *see* Schmidt, W.
Groth, J., Sur la bordure méridionale de la Meseta Ibérique, 213 †
Grothe, H., Meine Vorderasienexpedition 1906 und 1907..72 §; Neuen Verkehrsprobleme auf der westlichen Balkanhalbinsel, 461 †; Wie man in der asiatischen Turkei reist, 715 †
Ground-water—
Neuere Ansichten über das Grundwasser, W. Halbfass, 721 †
Groussac, P., Toponymie historique des côtes de la Patagonie, 219 †
Grubauer, A., Unter Kopfjägern in Central-Celebes, 103 †
Grubb, W. B., A church in the wilds, 104 †, 688 §
Grund, A., Fünfte Terminfahrt S. M. S. *Najade* in der Hochsee der Adria, 1912–1913..460 †
Gruner, H., Begleitworte zur Karte des Sechsherrenstocks, 466 †; Karte des Sechsherrenstockes, 228 †
Guatemala—
Guatemala and highest native American civilization: E. Huntington, 595 †
Guggisberg, F. G., Map of Nigeria, 602 †, 726 †
Guiana, British—
Indians, Aboriginal, Legends and myths of: W. H. Brett, 106 †
Guidi, I., Popolazioni delle Colonie Italiane, 225 †
Guieysse, M., Îles Wallis, 470 †
Guinea—
Harmattan wind of Guinea Coast: H. W. Braby, 339 §, 467 †
Guinea, French—
Frontier demarcation between Sierra Leone and French Guinea. 203
Mission d'abornement Liberia, Guinée, Côte d'Ivoir: Schwartz et Villatte, 467 †
Gunter, C. P., Photographs taken while in charge of Dibang Exploration Survey, 115 †
Gusherbrum glacier, 130

H.

Haardt von Hartenthium, V., Internationale Erdkarte in 1:1 million, 719 †; Kartographie der Balkanhalbinsel im 20. Jahrhundert, 711 †
Hacquet, Belsazar, und die Erforschung der Ostalpen und Karpathen: G. Jakob, 472 †
Haddon, A. C., remarks on "An expedition to Dutch New Guinea," 269
Hafkemeyer, J. B., A Costa septentrional do Brazil na cartographia dos primeiros lustros do seculo 16..219 †

Hahn, F., Hirtenvölker in Asien und Afrika, 471 †
Haimann, G., Cirenaica (Tripolitania), 106 †
Halbfass, W., Aus den unbekannten Spanien, 592 †; Castañedasee, der grösste Süsswassersee Spaniens, 200 §, 714 †; Einfluss der geographischen Lage auf die Wärmeverhältnisse von Seen, 721; Neuere Ansichten über das Grundwasser, 721 †
Hall, R. N., Appointment as Government Curator to Ancient Monuments of Rhodesia, 580
Haltenberger, M., On a genetic system of sand dunes, 222 †
Hamberg, A., Några ord om lufteirkulationen i norra Sverige, 214 †
Hamman Alessi, Jebel, 67
Hamza, E., Folkloristische Studien aus dem niederösterreichischen Wechselgebiete, 710 †
Handel-Mazzetti, H. Freiherr von, Mesopotamia and Kurdistan, 465 †
Hann, J. v., Niederschläge in Schweden, 593 †
Hannibal once more: D. W. Freshfield, 679 §
Hansen, F., *see* Bruun, D.
Hansen-Ostenfeld, C., Danske farvandes Plankton, Phytoplankton og Protozoer, 223 †
Hantzsch, Bernhard, und seine letzte Forschungsreise in Baffinland: M. Rosenmüller, 722 †
Hargrave, L., Fate of *Santa Ysabel* of Alvaro de Mendaña's Squadron, 581
Hark, or Tong-i-tuk, mountain, Northern India, 669, 670
Harley, G., Photographs of Crater Lake on Mount Elgon, 729 †
Harmattan wind of Guinea Coast: H. W. Braby, 339 §, 467 †
Harper, R. M., Botanical cross-section of Northern Mississippi, 594 †; Hempstead Plains of Long Island, 468 †
Harz mountains—
  Geoids im Gebiete des Harzes, Bestimmung des: F. R. Helmert, 591 †
Haselhurst, S. R. Northumberland, 214 †
Haskin, F. J., Panama Canal, 595 †
Hassinger, H., Schulwandkartes, 725 †
Haughton, H. L., Sport and folk-lore in Himalaya, 102 †
Hauran, Wadi, Arabia, 502
Hausa—
  English-Hausa Vocabulary of words in every-day use: A. H. Haywood, 217 †
  Hausa folk-tales: A. J. N. Tremearne, 594 †
Hauslab, R. von, Colouring methods on maps, 239
Haute-Savoie—
  Monographie géologique et paléontologique du Salève: E. Joukowsky et J. Faure, 711 †
Hauthal, R., Interozeanische Wasserscheide in Patagonien, 595 †
Haverfield, F., Ancient town-planning, 223 †, 334 §; remarks on "Relief in Cartography," 404
Hawaii—
  Lavafelder des Kilauea: A. Heim, 469 †
  Water resources of Hawaii, 1909–1911: M. O. Leighton and others, 354 †
Haywood, A. H., English-Hausa Vocabulary of words in every-day use, 217 †
Hazil, Wells of, Arabia, 504
Heaton, E. W., Comparative geography of six continents, 576 §
Hedemann, H. v., Schnellzugskarte des Deutschen Reiches, 600 †
Hedley, W. C., remarks on "Relief in Cartography," 400
Heim, A., Lavafelder des Kilauea, Hawaii, 469 †
Hellas and the Balkan Wars: D. J. Cassavetti, 213 †, 323 §
Heller, E., White Rhinoceros, 351 †
Hellmann, G., Dust-falls in Atlantic and the North-East Trades, 87
Helmert, F. R., Bestimmung des Geoids im Gebiete des Harzes, 591 †; Geoid und Erdellipsoid, 470 †
Henderson, J., *see* Hewett, E. L.
Henkel, L., Zusammenstellung von Zahlen für die Wasserführung der Flüsse, 721 †
Hennig, E., Frage de Gefährdung des Panamakanals durch geologische Ereignisse, insbesondere Erdbeben, 595 †
Hennig, R., Beiden Wasserscheiden der europäischen Binnenschiffahrt, 711 †; Canals and Internal Navigation in Russia, 577
Henry the Navigator, Prince, Golden Age of: J. P. O. Martins and others, 472 †
Hensley, F. K., Photographs of Mishmi Country, 730 †
Herbertson, A. J., Handbook of geography, 105 †; Higher units, 723 †; Oxford Wall Maps: the World, 361 †; remarks on "Relief in Cartography," 400; and J. Cossar, Commercial Geography of the World—Part II., 105 †, 439 §
Herderschee, F., Explorations in Dutch New Guinea, 207
Hergesell, H., and K. Wegener, Deutsche Wissenschaftliche Station auf Spitzbergen und die Schröder-Stranz Expedition, 470 †
Herrmann, A., Alte Verbindung zwischen dem Oxus und dem Kaspischen Meer, 464 †; Ptolemy's Geography of South-Eastern Asia, 579
Hersch, L., Juif Errant d'aujourdhui, 196 §
Herzegovina—
  Bosnisch-herzegovinische Bahnproblem, 461 †

Hess, H., Ueber die Plastizität des Eises, 597 †
Hesse, R., Okologischen Grundlagen der Tierverbreitung, 598 †
Hettner, A., Abhängigkeit der Form der Landoberfläche vom inneren Bau, 471 †
Hewett, E. L., and others, Physiography of Rio Grand Valley, New Mexico, 218 †
Heyking, Baron, remarks on "Sea Route to Siberia," 498
Hickmann, A. L., Geographisch-Statistischer Universal-Taschen Atlas, 229 †
Higgins, D. F.: *see* Grant, U. S.
Himalayas—
Altitude Insomnia, letter on: W. H. Workman, 97
Origin of Himalayas, Recent discussion on: R. D. Oldham, 464 †
Photographs taken in neighbourhood of Kangchenjunga: V. Sella, 115 †; ditto, J. B. Noel, 729 †
Sport and folk-lore in Himalaya: H. L. Haughton, 102 †
Sport and nature in Himalaya: P. R. Bairnsfather, 351 †
Hindie (Euphrates) Barrage, Geographical features, 415
Hingston, R. W. G., survey work in India, 669, 672
History—
Geographer, The, and History: E. Huntington, 19 *
Hittite Hieroglyphics, New decipherment of: R. C. Thompson, 216 †
Hives, F., remarks on "Geographical Results of Nigeria-Kamerun Boundary Commission," 650
Hjort, J.: *see* Murray, Sir J.
Hkamti Long country, 533
Hobbs, W. H., Mechanics of formation of arcuate mountains, 721 †
Hodgkinson, E. G., Preliminary geography, 576 §
Hofhuf, Arabia, 519
Högbom, A. G., Handbuch der regionalen Geologie. Fennoskandia, 592 †
Holdich, Sir T. H., obituary of Col. Gore, 92; remarks on: "Is the Earth drying up?" 316; "Relief in Cartography," 398, 403
Holland—
Aardrijkskundig woordenboek van Nederland: M. Pott, 100 †
Geologie, Regionalen, Handbuch der, Niederlande: G. Molengraaf und W. van W. van der Gracht, 592 †
Het Koninkrijk der Nederlanden: E. de Geest, 358 †
Maps: Geschiedkundige Atlas van Nederland: A. A. Beekman, 357 †
Holland, W. J., To River Plate and back, 354 †
Holtedahl, O., Zur Kenntnis der Karbonablagerungen des westlichen Spitzbergens, 221 †
Holtz, F., Principles and methods of teaching geography, 105 †, 438 §
Holy Land: *see* Palestine
Honduras—
Resources and industries of Honduras: S. MacClintock, 354 †
Hooker and Mueller glaciers, Note on rate of erosion of: P. Marshall, 220 †
Horta y Pardo, C. de, Verdadera Cuna de Cristóbal Colón, 224 †
Horwood, A. R., Story of plant life in British Isles, 350 †
Hosseus, C. C., Botanische . . . Studien über die Bambusstande, 471 †; Durch König Tschulalongkorns Reich, 215 †
Houy, Dr., Von der Logone-Pama-Grenzexpedition, 716 †
Howard, C., English travellers of the Renaissance, 356 †
Howard and Sheersby, Photographs of Federal Capital Territory, Australia, 363 †
Howarth, O. J. R., Commercial Geography of World, 197 §
Hübner, E., Beitrag zur Theorie der isostätischen Reduktion der Schwerebeschleunigung, 721 †
Hubrecht, P. F., remarks on "An expedition to Dutch New Guinea," 268
Hudson bay—
Expedition under J. B. Tyrrell, 444, 717 †
Surveys by Canadian Dept. of Naval Service, 339
Hugues, Luigi (Biography): G. Ricchieri, 224 †
Hulbert, A. B., Washington and the West, being George Washington's diary of September, 1784..218 †
Humphreys, W. J., Volcanic dust and other factors in production of climatic changes, etc., 341 §, 355 †, 471 †
Hungary—
Climatic changes, 171
Quellgebiet des Warmen Szamos: G. Czirbusz, 592 †
Hunter, L. W., Cicero's journey to his province of 51 B.C., 465 †
Huntington, E., Asia; A Geography Reader, 199 §; Climate of Greece, 164; Climate changes in North America, 299; Geographer and History, 19 *; Guatemala and highest native American civilization, 595 †; New science of Geography, 722 †; Theory of desiccation of Earth, 150
Hutchinson, L., Panama Canal and competition for trade in Latin America, the Orient, and Australasia, 219 †
Hutton, E., Ravenna, a Study, 72 §
Hwang-ho—
Hydrography, Dynamic meteorology and: V. Bjerknes and others, 597 †
Laufänderungen des Gelben Flusses in Historischer Zeit: J. Menauer, 203 §

I.

Ice—
Inlandeises, Einige Probleme des: O. Nordenskjöld, 597 †

Ice—*continued.*
Plastizität des Eises, Ueber die: H. Hess, 597 †
Ice Age—
Problems of the Ice Age, etc., letter on: M. Manson, 706
Volcanic Dust as a Factor in Production of Ice Ages: W. J. Humphreys, 341 §, 355 †, 471 †
Icebergs—
Eisberge und Schiffahrt: O. Baschin, 721 †
Iceland—
Maps: Generalstabens Topografiske Kort over Island, 600 †; Kort over Island; D. Bruun and F. Hansen, 108 †
Polygonboden und "thufur" auf Island: T. Thoroddsen, 592 †
Vulkan, Islands Grösster: H. Spethmann, 679 §
Ice-sheet, Meteorological Conditions of an: C. E. P. Brooks, 698 §, 700 †
Idaho—
Erosion surface, Old, in Idaho: J. B. Umpleby, 468 †
India—
Big Game Shooting in India, Burma, and Somaliland: V. M. Stockley, 74 §
Coalfields of India: V. Ball and R. R. Simpson, 102 †
East India Company, Calendar of Court minutes, etc., 1650–1654: E. B. Sainsbury, 215 †
India and the Indians: E. F. Elwin, 74 §
India of To-day: E. C. Meysey-Thompson, 351 †
Indien: Handbuch für Reisende: K. Bædeker, 102 †
Maps: Maps published by Survey of India during quarter ending December 31, 1913..226 †, 600 †
North; Deflection of Plumb-line in: S. G. Burrard, 692
North-East Frontier Exploration, 337
Peoples of India: J. D. Anderson, 102 †
Pepys of Mogul India, 1653–1708: N. Manucci and W. Irvine, 215 †
Photographs taken by C. P. Gunter while in charge of Dibang Exploration Survey, 115 †
Photographs of Mishmi Country: F. K. Hensley, 730 †
Railway connection between India and Ceylon, 693
Simples and Drugs of India, Colloquies on: G. da Orta, 684 §
Survey of India, General Report on operations of 1911–12: S. G. Burrard, 102 †
Indian Alps and how we crossed them: N. E. Mazuchelli, 106 †
Indian Ocean—
Maps: Meteorological Charts (Met. Office), †114, 231, 363, 479, 604; Pilot Charts (U.S. Hydrog. Office), †114, 231, 363, 479, 604
Indo-China—
Maps: Carte de la Mission Pavie, 358 †
Indo-Russian Triangulation Connection: K. Mason, 664 *
Indrapura or Korinchi, Mount Sumatra, 694
Indus—
Rift of Indus river, 429
Inexpressible Island, South Victoria Land, 4
Ireland—
Dún Galion, ancient fortress in Leinster: G. H. Orpen, 200
Geographical Pilgrimage from Ireland to Italy: W. M. Davis, 225 †
Maps: Tourist's Map of Ireland: J. Bartholomew, 600 †
Origin and history of Irish names of places: P. W. Joyce, 350 †
Pottery manufacture in Ireland, Notes on: M. S. D. Westropp, 214 †
Iron—
Eisenvorräte der Erde: M. Eckert, 472 †
Irving, A., Notes on a buried (East Mercian) river channel near Peterborough, 214 †
Isachsen, G., Hydrographic observations of Isachsen Spitsbergen Expedition, 221 †; Rapport sur l'Expédition Isachsen au Spitzberg, 1909–1910..221 †
Italian Colonies—
Cartografica coloniale dell Istituto Geografico Militare: G. Cora, 716 †
Popolazioni delle Colonie Italiane: I. Guidi, 225 †
Italy—
Bacini della Meduna e del Colvera in Friuli: G. Stefanini, 101 †
Fenomeni della erosione . . . nel bacino del Correcchio: G. Azzi, 100 †
Geographical pilgrimage from Ireland to Italy: W. M. Davies, 225 †
Navigation in interior of Northern Italy, 440
Popolazione d'Italia, Superficie e: E. Cianetti, 101 †
Spiaggia de Chiavari-Lavagna, Sulle condizioni della: D. Omodei, 101 †
Temperatura in Italia, Variazione diurna della: F. Eredia, 100 †
Ivory—
Arabic and Chinese trade in Walrus and Narwhal Ivory: B. Laufer, 350 †
Ivory Coast—
Maps: Côte d'Ivoire: A. Meunier, 476 †; Côte d'Ivoire (Service Géog. des Colonies, Paris), 358 †
Mission, d'adornement Liberia, Guinée, Côte d'Ivoire: Schwartz et Villatte, 467 †
Iwasaki, C., Metallogeny of Japanese Islands, 103 †

J.

Jackson, H. C., Black Ivory and White, or Story of El Zubeir Pasha, 224 †, 431 §

Jackson, J., Journey from India towards England in 1797 106 †
Jaeger, F., Hochland der Riesenkrater und umliegenden Hochländer Deutsch-Ostafrikas, 216 †
Jahn, A., Cordillera Venezolana de los Andes, 219 †
Jakob, G., Belsazar Hacquet und die Erforschung der Ostalpen und Karpathen, 472 †
James, Sir H., Plans and photographs of Stonehenge, and of Turusachen in Island of Lewis, 107 †
Japan—
Evolution of New Japan: J. H. Longford, 102 †
Japanese Empire, including Korea and Formosa: T. P. Terry, 593 †
Japan's inheritance: E. B. Mitford, 428 §
Metallogeny of Japanese Islands: C. Iwasaki, 103 †
Volcanic Eruption of January, 1914.. 202
Jarabub Oasis, A Visit to, by mission under Dr. Abdul Ghani, 338
Java—
Vegetationsbilder aus Java: K. Domin, 464 †
Jenkins, O. P., Geology of region about Natal, Rio Grande do Norte, 469 †
Jerusalem—
Russian pilgrims to Jerusalem, With the: S. Graham, 351 †
Jews—
Juif Errant d'aujourdhui: L. Hersch, 196 §
Jiménez, J. V., Industria del petróleo en el Perú, 595 †
Joerg, W. L., New boundaries of Balkan States and their significance, 711 †; On proper map for determining location of earthquakes, 223 †
Johnson, C., Highways and byways from St. Lawrence to Virginia, 218 †
Johnson, M., Through South Seas with Jack London, 596 †
Johnston, M. S., Photographs of Alps, 728 †; Photographs of Thebes, Egypt, 729 †
Johnston, R. F., Buddhist China, 102 †
Johnston, Sir H. H., letter on Tribal Movements in Africa, 96; Pioneers in South Africa, 217 †
Johnston, W. & A. K., Land Form Pictures. I. Continental Islands, 603 †; New Era School Atlas, 362 †; Scholar's geographical exercise book, 472 †
Jordan, W., and others, Handbuch der Vermessungskunde, 596 †
Joukowsky, E., et J. Faure, Monographie géologique . . . du Salève (Haute-Savoie), 711 †
Jousset, P., La France: Géographie Illustrée, 71 §
Joyce, P. W., Origin and history of Irish names of places, 350 †
Joyce, T. A., Notes on physical anthropology of Chinese Turkestan and Pamirs, 464 †
Juan, D. Jorge, Biografía de: E. L. y Ortiz, 224 †
Jubaland—
Through Jubaland to Lorian Swamp: I. N. Dracopoli, 593 †
Juliana, Mount, New Guinea, Height of, 208
Junod, H. A., Life of a South African Tribe, 324 §
Jura mountains—
Morphologie des Berner Jura: P. Schlee, . 593 †

K.

Kaberi or Kondus glacier, 136
Kaiser, E., Kammerbühl bei Eger, 461 †
Kalahari—
Climatic changes in, 298
Kamerun—
Ardrar au Cameroun: G. de Gironcourt, 217 †
Auf der Savanne; Tagebuch einer Kamerunreise: M. P. Thorbecke, 466 †
Botanische Wanderung nach Deutsch-Adamaua: C. Ledermann, 716 †
Boundary Demarcation, Nigeria-Kamerun, Commission of 1912–13, Geographical Results of: W. V Nugent, 630 *
Höhenschichtenkarte von Komerun mit Togo in 1: 2,000,000, Begleitworte zu der: M. Moisel, 717 †
Logone-Pama-Grenzexpedition, Von der: — Houy, 716 †
Maps: Höhensichtenkarte von Kamerun mit Togo: M. Moisel, 359 †; Karte von Kamerun: M. Moisel, 228 †
Nigerishe Grenze von Kamerun zwischen Yola und dem Cross-Fluss: H. Detzner, 716 †
Nordrande des Kamerunplateaus, Forschungen am: K. Strümpell, 716 †
Schiffahrts-Expedition, 716 †
Kampers, F.: *see* Frech, F.
Kapok industry: M. M. Saleeby, 715 †
Kara sea—
Currents and distribution of ice, 488
Karakoram—
Features of Karakoram glaciers connected with pressure, especially of affluents: W. H. Workman, 715 †
Siachen Basin and Glacier System, Physical Characteristics of: W. H. Workman, 273 *
Siachen or Rose Glacier, Exploration of: F. B. Workman, 117 *
Karlsbad—
Maps: Politischen und Schulbezirkes Karlsbad: G. Freytag and Berndt, 723 †
Karluk, vessel of V. Stefánsson's expedition, mishap to, 447

Karstedt, F. D., Gegenwärtiges und Zukunftiges von Tanganyikasee, 716 †
Karstens, H. P., Ascent of Mount Denali (Mackinley), 83
Kashmir—
Beyond the Pir Panjal: E. F. Neve, 593 †
Expedition under F. De Filippi, 32
Photographs of Wardwan Valley, Kashmir: Miss K. I. Lillingston, 729 †
Thirty Years in Kashmir: A. Neve, 429 †
Katanga—
Kundelungu, Quelques notes sur: E. Deladrier et M. Robert, 465 †
Katsena river, Nigeria, 640
Keidel, H., Junge fluviatile Aufschüttungen in den nördlichen argentinischen Anden, 468 †
Keir, R. M., Proposal to make New London a port of entry, 468 †
Keith, A. B.: *see* Lucas, Sir C. P.
Keller, H., Hydrographischen Verhältnisse der Nordsee, 597 †
Keller, O., St. Petersburg and its environs, 101 †
Keltie, J. S., Thirty Years' progress in Geographical Education, 419
Kennan, G., An island in sea of history. Highlands of Daghestan, 461 †
Kergomard, J. G.: *see* Dubois, M.
Kermack, W. R., Historical Geography of Scotland, 428 §
Kerr, J. G.: *see* Evans, A. N.
Kertzell, S. V., On Bolshezemelsk Tundra and its nomads, 213 †
Keyes, C. R., Original streams, and their rôle in general desert leveling, 355 †
Keyssler, C., Erste Ersteigung der östlichen Gippel des Finisterregebirges, 469 †
Khalkha: A Schønebeck, 103 †
Kher, Wadi el, Arabia, 503
Kiepert, H., Formæ Orbis Antiqui, 603 †
Kiepert, R., Karte von Kleinasien, 725 †
Kigoma, Railway to, Completion of, 339
Kilian, W., and P. Reboul, Morphologie des Alpes française, 461 †
Kinabalu, Mount, Expedition of J. C. Moulton to, 441
Kincardine—
Geology of South-Eastern Kincardineshire: R. Campbell, 214 †
Kinematograph als Vermittler geographischer Bildung: W. Richter, 598 †
King, W. J. H., Geographical Distribution of some plants from Libyan Desert, 466 †
King George, Cataracts of: W. Macdonald, 351 †
King George V. peaks, Karakoram, 133
Kipling, R., Some aspects of Travel, 365 *
Kirei tribe, Mongolia, 190
Kirkpatrick, Hon. A., remarks on "Evolution of a Capital," 551
Kirschstein, E. F., Discovery of Unknown tribe in German East Africa, 82
Kissenberth, W., Ueber die hauptsächlichsten Ergebnisse der Araguaya-Reise, 218 †
Kivu, Lake—
Vulkanische Ausbruch im Norden des Kiwu-Sees: — Schumacher, 352 †
Kjellström valley, Spitsbergen, 584
Klebelsberg, R. v., Eiszeitliche Vergletscherung der Alpen, 710 †; Glazialgeologische Notizen vom bayrischen Alpenrande, 461 †; Gletschermessungen . . . in den Ostztaler Alpen, 1912..461 †; Wasserführung des Suldenbaches, 710 †
Kleinkemm, R., Wirtschaftliche . . . Bedeutung der südafrikanischen Kohle, 716 †
Klemm, G., Ueber einige auffällige Verwitterungsformen von Gesteinen des kristallinen Odenwaldes, 721 †
Kloss, C. B., Expeditions in Malaysia, 201, 694
Klotz, O., Earthquake of April 28, 1913.. 467 †
Kmunke, R., Meine Forschungsreise durch Uganda, 594 †; Quer durch Uganda, 217 †
Knoche, W., Observaciones meteorológicas, de la Isla de Pascua, 354 †
Koch-Grünberg, T., Meine Reise durch Nord-Brasilien zum Orinoco 1911–1913 ..718 †
Koebel, W. H., Making of the nations. South America, 354 †
Kohlschütter, E., Ueber die internationale Zeitkonferenz zu Paris, 1912..470 †
Koudus glacier, 136, 137
König, F., Austrian Antarctic expedition, 208
Kootenay—
Maps: East and West Kootenay (Dept. of Lands, B C.), 478 †
Köppen, W., Geographische Verbreitung der monatlichen Barometerschwankungen, 720 †
Korzer, K., Altes und Neues von der Landesaufnahme, 719 †
Kossmann, W., Bagdâdbahn im Taurus, 715 †
Kowarzik, R., Geographical Distribution of the Wild Sheep, 699 §; Verbreitung der Wildschafe (Map), 603 †
Krebs, W., Ionische Meer als eines der wichtigsten Felder ozeanographischer Forschung, 597 †; Sturmkatastrophen auf Kuba und Florida, 1910..469 †
Kropotkin, P., letter on Desiccation of Eurasia and some General Aspects of Desiccation, 451
Kühn, F., Aus den Hochkordilleren von San Juan, 468 †
Kulu and Lahoul: Hon. C. G. Bruce, 464 †
Kümmerly and Frey, Offizielle Eisenbahnkarte der Schweiz, 475 †

Kun or Beli peak, Nigeria, 637
Kuntz, J., Geologische Uebersichtskarte des Kaokofelds, 359 †
Kurdish Language, Grammar of E. B. Soane, 593 †
Kurdistan: H. Fohr. von Handel-Mazzetti, 465 †
Kusaiba, Arabia, 509

L.

Labrador—
New Quebec Territory, 445
Short trip into Labrador peninsula by way of Natashquan river: C. W. Townsend, 104 †
Lafaye, —,
Pays des Haouara, 715 †
Lagrange, — Circonscription du Batha, 352 †
Lahoul, Kulu and: Hon. C. G. Bruce, 464 †
Laing, R. M., Notes on chief physiographic features of Norfolk Island, 220 †
Lake District—
Maps: Bacon's Motoring and Cycling Road Map of Lake District, 600 †
Lakes—
Farbe des Seewassers, Zur Bedeutung der: H. Ammann, 597 †
Geographischen Lage auf die Wärmeverhältnisse von Seen. W. Halbfass, 721 †
Temperaturmaxima in den warmen Salzseen, Periodishe Entstehung doppelter: M. Rózsa, 597 †
Untersuchung des Lunzer Seen Verwendete Apparate und Gerätschaften: F. Ruttner, 721 †
Laking river, Burma, 525
Lallemand, C., La terre, sa forme et ses diménsions, 355 †
Lamja mountains, Nigeria, 632
Lamplugh, G. W., Physiographical Notes. II. On the Taming of Streams, 651 *
Land Forms—
Classification of Land Forms and Landscapes: J. D. Falconer, 424
Johnston's Land Form Pictures. I. Continental Islands, 603 †
Teaching of cycle of Land Forms: C. B. Fawcett, 225 †
Landes—
Fixité de la Côte landaise; B. Saint-Jours, 350 †
Landslides—
Classificazione e sull' origine delle frane: G. Trabucco, 720 †
Lane, G.: *see* Crandall, R.
Lang, R., Nordrand der Mittleren Schwäbischen Alb, 591 †
Langhans, P., Neuen Grenzen der Königreiche Serbien und Bulgarien, 711 †
La Paz—
Gorge of La Paz: H. E. Gregory, 218 †
La Pérouse, Loss of, C. M. Woodford, 581
Lapworth, C., Birmingham country, its geology and physiography, 593 †
Large, J. T., Some Notes on Atiu Island, Cook Group, 220 †
Largeau, — Carte du Ouadaï, 359 †
Latrobe, C. J., Alpenstock; or sketches of Swiss scenery and manners, 1825–1826.. 106 †
Laufer, B., Arabic and Chinese trade in Walrus and Narwhal Ivory, 350 †; Notes on Turquois in the East, 722 †
Laughton, A. E. S., obituary of, 94
Launay, L. de, Le Turquie que l'on voit, 102 †
Lautensach, H., Ueber den heutigen Stand unserer kenntnis vom präglazialen Ausschen der Alpen, 461 †
Lavaysse, J. J., Voyages aux Isles de Trinidad de Tobago, etc., 105 †
Law, M. C., Story of Bradford, 71 §
Lawson, A. C., Petrographic designation of alluvial fan formations, 222 †
Leachman, G. E., Journey through Central Arabia, 500 *; Photographs of Arabia, 480 †
Lechtal Alps—
Maps: Karte der Lechtaler-Alpen, Arlberg-Gebiet, 723 †
Leclercq, J., Finlande aux mille lacs, 349 †
Lecointe, G., Commission Polaire Internationale, 719 †
Ledermann, C., Eine botanische Wanderung nach Deutsch-Adamaua, 716 †
Leeds—
Maps: New Plan of Leeds and Suburbs; G. W. Bacon & Co., 474 †
Leeds, E. T., Archæology of Anglo-Saxon Settlements, 102 †, 322 §
Legendre, A. F., Au Yunnan et dans le Massif du Kin-ho, 215 †; Expedition in Western borderlands of China, 441
Legras, J., De Povénets à Arkhangel'sk, 213 †
Lehmann, O., Hausgeographie von Dithmarschen, 592 †; Uebertiefung des Tessingebietes, 714 †
Leighton, M. O., and others, Water Resources of Hawaii, 1909–1911.. 354 †
Leinster—
Dún Galion, ancient fortress in Leinster: G. H. Orpen, 200
Leith, C. K., Structural geology, 597 †
Lemoine, P., Handbuch der regionalen Geologie. Afrique Occidentale, 594 †
Leon, L. G., Intensidad de la gravedad en Mexico, 217 †
Letcher, O., Bonds of Africa, 351 †
Levick, G. M., Antarctic penguins, 596 †
Lévy-Salvador, P., Utilisation des forces hydrauliques du bassin de l'Isère, etc., 711 †
Lewinski, J. St., Origin of Property and formation of village community, 356 †

Liberia—
Mission d'abornement Liberia, Guinée, Côte d'Ivoire: Schwartz et Villatte, 467 †
Libyan Desert—
Eastern Libyans: O. Bates, 594 †
Exploration of: E. Banse, 444
Maps: Stand der Erforschung der Libyschen Wüste und Tibestis Anfang 1914: E. Banse, 602 †
Plants from Libyan Desert, Geographical distribution of some: W. J. H. King, 466 †
Lied, J., Sea Route to Siberia, I. The Voyage, 481 *
Life-boat and its story: N. L. Methley, 472 †
Lillingston, Miss K. I., Photographs of Wardwan valley, Kashmir, 729 †
Lima—
Guia mignon de Lima: C. B. Cisneros, 595 †
Provincia de Lima: C. B. Cisneros, 595 †
Limestones—
Karrenbildungen, Ueber: P. Arbenz, 355 †
Limpricht, W., Durchwanderung der Wutaischanketten, 464 †
Lindsay, G. A., Annual rainfall and temperature of United States, 595 †
Lion—
Book of the lion: Sir A. E. Pease, 105 †
Lipari Islands—
Intorno ad alcune sorgenti termali nelle isole Eolie: G. Platania, 101 †
Lisu tribe, North Burma, 531
Livingstone, B. E., Climatic areas of United States as related to plant growth, 468 †
Livingstone College, Principal of, Appointment of L. E. Wigram, 700
Livingstone, David—
Livingstone and Newstead: A. Z. Fraser, 77 §
Moglie di un grande esploratore Maria Moffat-Livingstone: A. Michieli, 472 †
Lloyd, R., and others, Twentieth-Century Impressions of Brazil, 75 §
Lobozi river, Central Africa, 442
Lolophond glacier, Karakoram, 121
London—
Maps: "Citizen" Series Maps of London: W. Stanford, 474 †; New two-inch Map of London and environs: E. Stanford, 107 †; Parliamentary Map of London and environs: E. Stanford, 107 †; Proposed railways, etc., affecting London: E. Stanford, 474 †; Railways of London and suburbs: R. J. Cook and Hammond, 357 †
London Library, Catalogue of: C. T. H. Wright and C. J. Purnell, 598 †
Long Island, Hempstead Plains of: R. M. Harper, 468 †
Longford, J. H., Evolution of new Japan, 102 †
Longstaff, F. V.: *see* Weston, S. C.
Longstaff, T. G., remarks on "Exploration of Siachen or Rose Glacier," 143
Lorentz, H. A., Photographs of Dutch New Guinea, 232 †
Lorian Swamp, Through Jubaland to the: I. N. Dracopoli, 593 †
Löschner, H., Schrittmass und seine Umwandlung in Metermass, 470 †
Lottermoser, E., Beiträge zur Kenntnis der Windverhältnisse über Mittelamerika, 469 †
Loughlin, G. F., Reconnaissance in Southern Wasatch Mountains, Utah, 595 †
Love, H. D., Vestiges of Old Madras, 73 §
Low, S., Egypt in transition, 465 †, 687 §
Löwe, F., Optische Bestimmung des Salzgehalts im Seewasser, 597 †
Lucas, Sir C. P., and A. B. Keith. Historical geography of British Colonies. vol. 3, West Africa, 351 †; vol. 4, South Africa, 352 †
Lucerna, R., Flächengliederung der Montblancgruppe, 461 †
Luguria—
Popolazione nella Riviera Ligure dal 1861 al 1901: G. Aicardi, 101 †
Lukas, G. A., Zur Landeskunde Albaniens, 460 †
Lumen river, Nigeria, 635
Luzon—
Geology of Luzon: W. D. Smith, 103 †
Lyde, L. W., Continent of Europe, 68 §
Lydekker, R., Dwarf Buffaloes of Southern Nigeria, 717 †
Lynch, H. F. B., obituary of, 93
Lyons, H. G., Relief in Cartography, 233,* 395 *

M.

M'Cance, T. W., Geographical factor in civilization, 471 †
MacClintock, S., Resources and industries of Honduras, 354 †
McClure, W. K., Italy in North Africa, 328 §
M'Crindle, John W. (Biography): W. B. Blaikie, 472 †
MacDonald, D. F., and W. C. Johnston, Isthmian Earthquakes, 718 †
Macdonald, Sir C., remarks on "Geographical Results of Nigeria-Kamerun Boundary Commission," 649
Macdonald, W., Cataracts of King George, 351 †; Conquest of the Desert, 685 §
Macgregor, J. C.: *see* Ellenberger, —
Machachek, F., Depression der eiszeitlichen Schneegrenze, 721 †
Machu Picchu, Discovery: H. Bingham, 219 †
McInnes, Mr., Survey work in India, 669, 671

Mackenzie, J., Report on Survey Operations for 1912–13. New Zealand. Department of Lands and Survey, 718 †
Mackinder, H. J., Teaching of geography and history as a combined subject, 225 †
McKinley, Mount (*see also* Denali)—
Ascent of Denali (Mount McKinley): H. Stuck, 83 §, 467 †, 717 †
Conquest of Mount McKinley: B. Browne, 353 †, 574 §
MacMunn, N. E., Upper Thames Country and Severn-Avon Plain, 428 §
Madagascar—
Mission géodesique à Madagascar: — Carrier, 216 †
Maddren, A. G., Koyukuk-Chandalar region, Alaska, 353 †
Madeira river, Brazil, New Tributary of, 697
Madras—
Madras Presidency, with Mysore, etc.: E. Thurston, 215 †, 682 §
Vestiges of Old Madras: H. D. Love, 73 §
Magellan straits—
Desolation island, Survey by W. S. Routledge, 446
Maggiore, Lake—
Valli Grande e d'Intragna, Brevi note antropogeografiche sulle: G. Pullé, 101 †
Magistrato alle Acque, R., Studi fitogeografici sulla laguna di Venezia, 350 †
Mahler, K., Klimaprofile, 720 †
Maize—
History cultivation, etc.: J. Burtt-Davy, 356 †
Makran, Desiccation of, 316
Malay Archipelago—
Geosynklinale und Rahmenfaltung . . . im austral-asiatischen Archipel: J. Elbert, 464 †
Malay Peninsula—
Geological history of Malay Peninsula: J. B. Scrivenor, 103 †
Malay States—
Maps: Topographical Survey of Federated Malay States, 226 †
Menuang Gasing, Mount, Expedition to: H. Ridley and C. B. Kloss, 201 §, 351 †, 694
Survey Dept., Report on, for 1912.. 464 †
Malaysia—
Expeditions by C. B. Kloss, 694
Man (*see also* Anthropogeography)—
Geographical control over Man, Permanence of: H. N. W. Collins, 355 †
Manitoba—
Maps: Chartered Banks of Manitoba (Dept. of Interior, Ottawa), 477 †; Manitoba, showing disposition of Lands (Dept. of Interior), 726 †
Manson, M., Bearing of facts revealed by Antarctic Research upon Problems of Ice Age, 706
Manucci, N., A Pepys of Mogul India, 1653–1708. Translated by W. Irvine, 215 †
Maps (*see also* Cartography)—
Autor der verschollenen "Mappa Mundi" im Palazzo di Venezia, Frage nach dem: P. Dengel, 598 †
Carte Internationale du Monde au Millionème, 178
Colours as representation of relief, 239, 395
Contours and maps explained and illustrated: F. Morrow, 333 §
Contours on maps, 236
Desideratum in map-making, Proposition by General Shokalsky, 210
Hachuring as representation for relief, 246
Internationale Erdkarte in 1:1,000,000: V. Haardt von Hartenthurm, 719 †
Land map of world on a new projection: B. Cahill, 86 §, 221 †
Ptolemy's maps, History of: P. Dinse, 566
Shade as representation of relief, 244
Maps, New—
Africa, 108, 227, 358, 476, 601, 726
America, 109, 229, 360, 477, 602, 726
Asia, 226, 358, 475, 600, 725
Atlantic Islands, 361
Australasia and Pacific Islands, 111, 229, 478
Europe, 107, 225, 356, 473, 599, 723
General, 113, 229, 361, 478, 603, 727
Polar Regions, 113
Marc-Schrader, L., Quand j'étais Maire de Tombouctou, 103 †
Marie-Victorin, Frère, Observations sur géologie et flore des terrains désertiques aux environs de St. Jérôme, 467 †
Marinelli, O.; *see* Dainelli, G.
Mariner's Mirror. Journal of Society for Nautical Research, 223 †
Maritime enterprise, 1485–1558: J. A. Williamson, 224 †
Mark, K. S., Preliminary study of salinity of sea-water in Bermudas, 223 †
Markham, Sir C. R., Review of 'Scott's last Expedition,' 16
Markham, V. R., South African scene, 216 †, 430 §
Marriott, R. A., Change in climate and its cause, etc., 596 †
Marshall, P., Note on rate of erosion of Hooker and Mueller glaciers, 220 †
Martelli, A., Isola di Stampalia, 216 †
Martin, L., Alaskan glaciers in relation to life, 717 †; Some features of glaciers and glaciation in College Fiord, Alaska, 717 †
Martin, W. F.: *see* Leighton, M. O.
Martineau, A., Mémoire sur quelques affairs de l'Empire Mongol, 1756–1761 ..593 †
Martins, J. P. O., and others, Golden age of Prince Henry the Navigator, 472 †

Martins, R., Mappa do Estado do Parana, 477 †
Martonne, E. de, Traité de géographie physique, 223 †
Maru tribe, Burma, 525, 526
Masoin, F., Histoire de l'Etat Indépendant du Congo, 687 †
Mason, K., Indo-Russian Triangulation Connection, 664
Masterman, E. W. G., Notes on some Tropical diseases of Palestine, 216 †; Summary of observations on rise and fall of level of Dead Sea, 1900–1913.. 79 §, 465 †
Matavanu auf Savaii im Jahre 1912: K. Sapper, 469 †
Mathieson J.: *see* Bruce, W. S.
Matthews, E. R., Coast Erosion and Protection, 323 §
Matto Grosso—
Reisen in Matto Grosso im Jahre 1910: M. Schmidt, 219 †
Maugham, R. C. F., Wild game in Zambezia, 466 †
Maurer, J., Evaporation from Lakes Zug and Egeri, 79
Mawson, D., Antarctic Expedition, Return of, 414
Mazuchelli, N. E., Indian Alps and how we crossed them, 106 †
Medals, Royal, and other Awards of R.G.S. for 1914..690
Mediterranean—
Aviens "Ora maritima" und ihr Wert für das entwicklungsgeschichtliche Studium der Mittelmeerküsten Frankreichs und Spaniens: J. Frank, 592 †
Gezeiten des Mittelmeeres: — Wegemann, 597 †
Gezeiten des Mittelmeeres, Zur Theorie der: R. v. Sterneck, 598 †
Pluvial Period, 304
Materiali per la conoscenza del Mediterraneo: G. Dainelli and others, 223 †
Mittelmeergebiet: A. Philippson, 101 †
Melanesian Migrations: G. Friederici, 698
Mellor, E. W., Lantern slides of Rajputana, 232 †
Menauer, J., Laufänderungen des Gelben Flusses in Historischer Zeit, 203 §
Menaung Gasing, Mount, Selangor, Expedition to: H. N. Ridley and C. B. Kloss, 201, 694
Mendaña, Alvaro de, Fate of the *Santa Ysabel* of squadron of: L. Hargrave, 581
Meniaud, J., Haut-Sénégal-Niger, 326 §
Mercadier, M., Armée noire Anglaise en Afrique occidentale, 716 †
Mercator—
Anniversaire, Le 400e, de la naissance de Gérard Mercator à la Société royale de Géographie d'Anvers: M. Denucé, 722 †
Merionethshire: A. Morris, 214 †
Merz, A., Land- und Seeklima, 720 †
Mesopotamia—
Lantern slides of Mesopotamia: H. E. Weber, 231 †
Mesopotamia: H. Freiherr von Handel-Mazzetti, 465 †
Meteorology—
Dynamic meteorology and hydrography: V. Bjerknes and others, 597 †
Temperaturdifferenz zwischen freier Atmosphäre und Berggipfeln: H v. Ficker, 356 †
Methley, N. L., Lifeboat and its story, 472 †
Meunier, A., Côte d'Ivoire (Map), 476 †
Mexico—
Censo verificado en la Republica Mexicana en Octubre de 1910, Apuntes relativos al: E. Wittich, 467 †
Climatic changes in, 299
Cotone, Il "dry farming" e la coltura del: C. Aliotti, 217 †
Crónica de la Nueva España: F. Cervantes de Salazar, 594 †
Gravedad en Mexico, Intensidad de la: L. G. Leon, 217 †
Mexico, Land of Unrest: H. Baerlein, 575 §
Real Mexico, a study on the spot: H. H. Fyfe, 594 †
Meyer, E., Bericht über eine Expedition nach Aegypten zur Erforschung der Darstellungen der Fremdvölker, 466 †
Meyer, H., Kagerafluss in Ostafrika und die Ruandabahn, 716 †; Ostafrika-Expedition, 1911 (Map), 227 †
Meysey-Thompson, E. C., India of to-day, 351 †
Michel, G., and C. Knapp, Documents cartographiques de géographie économique, 722 †
Michelin, Carte, France en 47 Feuilles, 357 †
Michieli, A., Moglie di un grande esploratore Maria Moffat-Livingstone, 472 †; Per una Maggiore conoscenza del nostro paese e l'apprendimento razionale della geografia, 599 †
Michigan—
Ohio-Michigan boundary line: C. G. Eirich, 595 †
Migeod, F. W. H., Languages of West Africa, 431 §
Milan—
Waterway between Milan and Venice: M. Beretta, 440
Mill, H. R., Elementary commercial geography, 472 †; Realm of Nature, an outline of physiography, 105 †, 334 §
Miller, G. S., Catalogue of the Mammals of Western Europe in the collection of the British Museum (Natural History), 349 †
Miller, W., Ottoman Empire, 1801–1913.. 214 †, 334 §

Mineral waters—
Nature des eaux minérales, Contribution à la connaissance de la: E. Fleury, 222 †
Minns, E. H., Scythians and Greeks, 76 §
Mississippi—
Botanical cross-section of Northern Mississippi: R. M. Harper, 594 †
Missouri—
New Madrid and other earthquakes of Missouri: F. A. Sampson, 218 †
Mitford, E. B., Japan's Inheritance, 428 §
Moffit, F. H., Geology of Nome and Grand Central quadrangles, Alaska, 353 †
Mohawk Valley, Fault-block topography of: G. B. Roorbach, 218 †
Moisel, M., Begleitworte zu der Höhenschichtenkarte von Kamerun mit Togo, 717 †; Höhensichtenkarte von Kamerun mit Togo, 359 †; Karte von Kamerun, 228 †; Uebersicht-kaarte der deutschen Grenze zwischen Yola und den Crossschnellen, 360 †
Molengraaf, G., and W. van W. van der Gracht, Handbuch der regionalen Geologie. Niederlande, 592 †
Möller, J., Schwarzschildsche Libellensextant, 470 †
Molonglo river, New South Wales, 391
Monaco, Prince of, Carte générale bathymétrique des Océans, 229 †
Mongolia—
Contins sino-mongols: R. Verbrugge, 714 †
Excursion en Mongolie: R. Verbrugge, 350 †
Maps of Mongolia and Dzungaria by Mr. Carruthers, letter on: W. W. Obrucheff, 708
Russians in Mongolia, With the: H. G. Perry-Ayscough and R. B. Otter-Barry, 464 †, 683 §
Unknown Mongolia: D. Carruthers, 189 §
Voies de communication dans Mongolie intérieure: B. De Wilde, 714 †
Montana—
Geology and ore deposits of Philipsburg Quadrangle, Montana: W. H. Emmons and F. C. Calkins, 468 †
Montaudon, G., Au Pays Ghimirra, 430 §
Monti, V., Sull' azione refrigeratrice dei ghiacciai, 222 †
Monuments—
Great stone monuments in history and geography: J. W. Fewkes, 355 †
Moore, Lake, Westralia, 662
Moraine streams of glaciers, 280–286 †
Moraudi, L., Diez años de observaciones meteorologicas in el Observatorio del Prado, 219 †
Morocco—
Maps: Maroc: M. Fallex, 476 †
Morrell, R. C., Photographs of Spitsbergen and Bear Island, 480 †
Morris, A., Merionethshire, 214 †
Morrow, F., Contours and maps explained and illustrated, 333 §
Morshead, H. T.: *see* Bailey, F. M.
Mort, F., Commercial geography of British Isles, 472 †
Mosse, A. H. E., My Somali book, 216 †, 686 §
Moulton, J. C., Expedition to Mount Kinabalu, Borneo, 441, 715 †
Mountains—
Mechanics of formation of arcuate mountains: W. H. Hobbs, 721 †
Origin, growth and decay: J. Geikie, 222 †, 689 §
Origin of Mountains: S. G. Burrard, 2[illegible]
[illegible]onnaire d'enquêtes géographiques en montagne: R. Blanchard, 722 †
Mueller and Hooker Glaciers, Note on rate of erosion of: P. Marshall, 220 †
Muir, R., and G. Philip, Wall Atlas of Modern History, 362 †
Munchi tribe, Niger-Kamerun boundary, 641
Munro, J.: *see* Adams, M. I.
Munro, R. M., A Text-book of Geography, 199 §; and others, Artificial islands in Lochs of Highlands of Scotland, 214 †
Murray river, Australia, Storage Scheme, 697
Murray, Sir J., obituary, 585; The ocean, 222 †; and J. Hjort, Scientific results of *Michael Sars* North Atlantic expedition, 1910..471 †
Murrumbidgee river, New South Wales, 391, 392, 537
Mushketoff, D., Geological construction of East Fergana, 215 †
Mutschmann, H., Place-names of Nottinghamshire, 350 †
Mwanza tribe, East Africa, 589
Myitkyina, Journey from, to Sadiya, viâ N'Mai Hka and Hkamti Long: B. E. A. Pritchard, 521 *
Mylius-Erichsen, L., Danmark-Ekspeditionen til Grønlands Nordostkyst 1906–1908..470 †

N.

Naber, S. P., Samuel Brun's Schiffahrten (1624), 224 †
Naingvaw tribe, Burma, 526
Nansen, F., Sea Route to Siberia. II. On Ice Conditions and Possibility of Regular Navigation, 488 *; Waters of North-Eastern North Atlantic. Investigations made during cruise of *Frithjof*, 721 †
Nassau range, Dutch New Guinea, 248
Natal—
Œcological survey of Midlands of Natal: J. W. Bews [illegible] †, 580 §
National Culture, Geography of, letter on: G. Czirbusz, 96

Nature, Realm of: H. R. Mill, 105 †, 334 §
Nautical mile—
Geschichte der Seemeile: H. Wagner, 719 †
Nautical Research, Journal of Society for. The Mariner's Mirror, 223 †
Navigation—
Toortse der zee-vaert: D. Ruiters (1623) Samuel Brun's schiffahrten (1624): S. P. Naber, 224 †
Neckel, G., Erste Entdeckung Amerikas im Jahre 1000 n. Chr., 329 §
Nefud, Arabia, Horseshoe depressions in, 506
Nelles, D. H., Precise levels along Dawson and Glacier roads from Wh. Pass to 141st Meridian, 467 †
Nelson, H., En bergslagsbygd, 714 †
Nestler, J., Beiträge zur Kenntnis der Ruinenstätte von Tiahuanaco, 468 †
Neu-Lauenburg, Sammelaufenthalt in: C. Ribbe, 718 †
Neve, A., Thirty Years in Kashmir, 429 §
Neve, E. F., Beyond the Pir Panjal, 593 †
Newbigin, M. I., Animal Geography, 197 §; Elementary Geography of Scotland, 197 §; Geography in Scotland since 1889..593 †
New Caledonia—
New-Caledonien: F. Sarasin, 469 †
Voyage en Nouvelle-Calédonie: F. Sarasin, 718 †
Newfoundland—
Four Skraeling words from Markland (Newfoundland) in Saga of Erik the Red: W. Thalbitzer, 224 †
Géographie de Terre-Neuve: R. Perret, 467 †
Ice conditions in 1912..209
Romance of Newfoundland Caribou: A. A. R. Dugmore, 104 †
Visual Instruction Committee Handbooks, No. 4. Canada and Newfoundland: A. J. Sargent, 575 §
New Guinea, British (*see also* Papua)—
In far New Guinea: H. Newton, 596 †
Vita dei Mekeo nella Nuova Guinea: V. M. Egidi, 220 †
New Guinea, Dutch—
Bergstamm Péségém in Innern von Niederländisch-Neu-Guinea: J. W. van Nouhuys, 220 †
Botany, 265
Climate, 267
Expedition to Dutch New Guinea: A. F. R. Wollaston, 248 *, 688
Explorations in Dutch New Guinea, 207
Native populations, 259, 269
Photographs: H. A. Lorentz, 232 †
Photographs taken on an expedition to Dutch New Guinea: A. F. Wollaston and C. B. Kloss, 729 †
Physical features, 264
Zoology, 269
New Guinea, German—
Durchquerung des Gebiets zwischen Kaiserin-Augustafluss und Küste: R. Thurnwald, 718 †
Erste Ersteigung der östlichen Gippel des Finisterregebirges: C. Keyssler, 469 †
Grenzfestsetzungs von Kaiser-Wilhelmsland, Arbeiten des Hauptmanns Foe ster bei Gelegenheit der, 718 †
New Hebrides—
Südsee, Urwald, Kannibalen: F. Speiser, 104 †, 435 §
Two Years with Natives in Western Pacific: F. Speiser, 435 §
Volcanic eruption on island of Ambrym, 208
New London—
Proposal to make New London a port of entry: R. M. Keir, 468 †
New Madrid—
Earthquake: M. L. Fuller, 192 §
New Madrid and other earthquakes of Missouri: F. A. Sampson, 218 †
New Mexico—
Physiography of Rio Grande Valley, in relation to Pueblo culture: E. L. Hewett and others, 218 †
Newport—
Hafen von Newport News: A. Ruhl, 717 †
New Quebec, Labrador, Territory of, 445
New South Wales—
Maps: New South Wales, including Lord Howe Island (Dept. of Lands, Sydney), 111 †; New South Wales, showing local government shires and municipalities (Dept. of Lands), 111 †
Mercury or "Quicksilver" in New South Wales: J. E. Carne, 354 †
Seismic area, 541
Voyage to establish a colony at Port Philip in Bass's Strait, on south coast of New South Wales, Account of: J. E. Tuckey, 107 †
Newton, A. P., Colonising activities of English Puritans, 594 †
Newton, H., In far New Guinea, 596 †
New Zealand—
Climber in New Zealand: M. Ross, 469 †
Photographs of North Island: H. O. Friud, 115 †
Redcliff gully, Rakaia river: R. Speight, 220 †
Survey Operations for 1912–13, Report on: J. Mackenzie, 718 †
Nicoll, M. J.: *see* Evans, A. H.
Niedermayer, O., Persien-expedition, 715 †
Niger—
Haut-Sénégal-Niger: J. Meniaud, 326 §
Zone d'inondation du Niger: R. Chudeau, 352 †

Nigeria—
Amalgamation of Northern and Southern territories, 203
Boundary Demarcation, Nigeria-Kamerun, Commission of 1912–13, Geographical results of: W. V. Nugent, 630 *
Buffaloes, Dwarf, of Southern Nigeria: R. Lydekker, 717 †
Edo-speaking peoples of Nigeria, Anthropological report on: N. W. Thomas, 216 †
Frontier between Nigeria and Cameroons, etc., Agreement between United Kingdom and Germany, 716 †
Maps: Southern Nigeria: F. G. Guggisberg, 602 †, 726 †
Photographs taken on Nigeria-Kamerun Boundary Commission of 1812–13: W. V. Nugent, 730 †
Plants collected by Mr. and Mrs. P. A. Talbot in Oban District, Catalogue of, 466 †
Nile—
Irrigation works, 573
Rains of Nile Basin and Nile Flood of 1911: J. I. Craig, 352 †
Nino, Fr. B. de, Etnografia Chiriguana, 353 †; Guia al Chaco Boliviano, 353 †
Nitrate—
Nitrate de Soude du Chili: A. Verbruggen, 219 †
Nitrate fields of Chili: W. S. Tower, 354 †
Nitsche, G., Ursprung der jährlichen Ueberschwemmung in Ovamboland, 466 †
N'Mai river, Burma, 521
Nobiling, H.: *see* Sprigade, P.
Noel, J. B., Photographs of Himalayas, 729 †
Nomads—
Hirtenvölker in Asien und Afrika: F. Hahn, 471 †
Nordenskiöld, O., Antarktis Handbuch der regionalen Geologie, 470 †; Einige Probleme des Inlandeises, 597 †; and L. Palander, Plan for a new Anglo-Swedish Antarctic Expedition, 554 *
Norfolk Island—
Physiographic features of Norfolk Island, Notes on: R. M. Laing, 220 †
North sea—
Hydrographischen Verhältnisse der Nordsee: H. Keller, 597 †
Jahresschwankungen im mittleren Wasserstande der Nordsee und Ostsee: — Brehmer, 353 §, 592 †
Variations of Mean Sea-level in North Sea and Baltic: — Brehmer, 335
Northumberland: S. R. Haselhurst, 214 †
Norway—
Maps: Kystkarter (Norges Geog. Opmaaling), 114 †
Ten Years near the Arctic Circle: J. J. Armistead, 101 †
Nottinghamshire—
Agriculture, 52
Canals, 57
Climate, 48
Coal mining, 50
Farming and Factories, 58, 59
Geological formation, 49
Nineteenth Century, Nottinghamshire in: B. C. Wallis, 34 *
Place-names of Nottinghamshire: H. Mutschmann, 350 †
Population changes, 35
Railways, 54
Nouhuys, J. W. van, Bergstamm Pěsčgěm in Innern von Niederländisch-Neu-Guinea, 220 †
Novorossisk, Ueber die Bora in: A. Arndt, 465 †
Nubia—
Archæological Survey of Nubia: C. M. Firth, 324 §
Egypte et la Nubie: E. de Cadalvène et J. de Breuvery, 106 †
Nubra river, Karakoram, 117
Nugent, W. V., Geographical Results of Nigeria-Kamerun Boundary Demarcation Commission of 1912–13.. 630 *; Photographs taken on Nigeria-Kamerun Boundary Commission of 1912–13.. 730 †
Nyasaland—
Winning a Primitive People: D. Fraser, 104 †, 328 §

O.

Obi river—
Navigation, 482
Obrucheff, V., Kalkinskigebirge im westlichen Altai, etc., 464 †; letter on Mr. Carruthers' Maps of Mongolia and Dzungaria, 708
Oceanography—
Crinoids, Recent, as a Guide to Abyssal Circulation of the Oceans: A. H. Clark, 583
Danske farvandes Plankton. Phytoplankton og Protozoer: C. Hansen-Ostenfeld, 223 †
Deep-sea and comparable faunas: A. H. Clark, 721 †
Ionische Meer als eines der wichtigsten Felder ozeanographischer Forschung: W. Krebs, 597 †
Kritischer Böschungswinkel und Kritische Tiefe: P. Putsche, 721 †
Lithologie sous-marine, Notes de: J. Thoulet, 222 †
Meeres-photometer: K. Grein, 471 †
Ocean; a general account of science of the sea: Sir John Murray, 222 †
Oberflächentemperaturen im Südlichen Atlantischen, etc.: T. Eylert, 597 †
Salzgehalts im Seewasser, Optische Bestimmung des: F. Löwe, 597 †
Termometro a rovesciamento Richter e tavole per la sua correzione: G. Ferruglio, 223 †

Oceans—
Maps: Carte générale bathymétrique des Océans: Prince of Monaco, 229 †
Répartition géographique des Océans, etc.: A. Berget, 222 †
Ogier, J. C. H. Riverina, 220 †
Ogowé—
Lacs du Bas-Ogooué: M. Le Terrier, 103†
Ohio—
Deep boring, Geology of, 206
Ohio-Michigan boundary line. Establishing of: C. G. Eirich, 595 †
Ohio river—
Floods of 1913: R. M. Brown, 218 †
Ohnefalsch-Richter, H., Griechische Sitten und Gebräuche auf Cypern, 102 †
Okavango—
Maps: Deutsche Zone des Okawango nach den Aufnahmen Franz Seiner's im 1911..228 †
Olbricht, K., Deutschen Grossstädte, 592 †
Oldham, R. D., Recent discussion on origin of Himalayas, 464 †
Oliver, F. W., and E. J. Salisbury, Shore protection by artificial planting, 577
Olympia, Burial of, 164
Olympic mountains—
Photographs of Olympic Mountains Washington: H. Appleton, 364 †
Omodei, D., Sulle condizioni della spiaggia Chiavari-Lavagna, 101 †
O'Neil, J., Grammar of Sindebele dialect of Zulu, 217 †
Oppel, A., Schiffbesitz und Schiffbau in geographischer Verbreitung, 472 †; Der Welthandel, 355 †
Orange river—
Cataracts of King George: W. Macdonald, 351 †
Great Falls of, 686
Photographs of: A. W. Rogers, 730 †
Ordnance Survey—
Maps of England and Wales, 225 †, 357 †, 473 †, 599 †, 724 †
Progress of Ordnance Survey, Report of, 215 †
Orpen, G. H., Dún Galion, an ancient fortress in Leinster, 200
Orta, G. da, Colloquies on Simples and Drugs of India, 684 §
Ortiz, E. Leon y, Biografia de D. Jorge Juan, 224 †
Ortmann, A. E., Alleghenian divide and its influence upon freshwater fauna, 205 §, 468 †
Otter-Barry, R. B.: *see* Peary-Ayscough, H. G.
Ottoman Empire, 1801–1913: W. Miller, 214 †, 334 §
Ovamboland—
Ursprung der jährlichen Uebershwemmung in Ovamboland: G. Nitsche, 466 †
Oxus—
Alte Verbindung zwischen dem Oxus und dem Kaspischen Meer: A Herrmann, 464 †

P.

Pacific islands—
Melanesian Migrations: G. Friederici, 698
Two years with Natives in Western Pacific: F. Speiser, 435 §
Pacific ocean
Maps: Pilot Charts (U.S. Hydrog. Office), † 114, 115, 231, 363, 479, 604
Pacific Shores from Panama: E. Peixotto, 354 †
Pajares, R. V., Una carta náutica en la Biblioteca universitaria de Valencia, 356 †
Palander, L., and O. Nordenskjöld, Plan for a new Anglo-Swedish Antarctic Expedition, 554 *
Palazzo, L., Carta magnetica, del Benadir, 216 †
Palestine—
Camera Crusade through the Holy Land: D. L. Elmendorf, 74 §
Climatic changes, 152–162
Date palm cultivation, 159
Rainfall, 155–162
Tropical diseases of Palestine, Notes on Some: E. W. G. Masterman, 216 †
Palmén, E. G., Simon van Salinghens Karta öfver Norden 1601..356 †
Palmer, H., First ascent of Mount Sir Sandford, 467 †
Pamirs—
Physical anthropology of Chinese Turkestan and Pamirs, Notes on: T. A. Joyce. 464 †
Tringulation, British and Russian, Connection of, 336
Panama—
Earthquakes, Isthmian: D. F. MacDonald and W. C. Johnston, 718 †
République de Panama: T. Streitberg, 219 †
Panama Canal—
Au Canal de Panama: L. B. de la Valette, 354 †
Canal de Panama: P. Clerget, 718 †
Competition for trade in Latin America, Orient, and Australasia: L. Hutchinson, 219 †
Creation, destruction, and resurrection: P. Bunau-Varilla, 354 †
Culebra cut, 211
Earthquakes and the Panama Canal: C. Davison, 62 *
Engineering aspect of Panama Canal at present time, 1913: W. T. Taylor, 354 †
Frage der Gefährdung des Panamakanals durch geologische Ereignisse, insbesondere Erdbeben: E. Hennig, 595 †
Nouvelle voie maritime; Canal de Panama: D. Bellet, 104 †
Panama Canal: F. J. Haskin, 595 †

Panama Canal—*continued*.
Treaty obligations of United States relating to Panama Canal: C. Tower, 354 †
Pangwe, Die: G. Tessmann, 217 †
Pantanelli, D., Fossa angusta o fossa Augusta, 101 †
Papua (*see also* New Guinea, British)—
Coal . . . in Papua, Notes on occurrence of: J. E. Carne, 220 †
Exploration by Massey-Baker Expedition, 208
Girara District, Western Papua, Description of: W. N. Beaver, 407 *
Tribes of, 257-264
Paraguay—
Church in the wilds: W. B. Grubb, 104 †, 688 §
Isolierten Gebirge im Tiefland des Paraguay, Einige Bemerkungen über die: K. Carnier, 718 †
Paraguayischen Chaco, Skizzen vom: K. Carnier, 718 †
Petrographie Paraguays und Matto Grossos: M. Goldschlag, 718 †
Paramaribo—
Lengte van Paramaribo: P. W. Sachse, 219 †
Parana—
Maps: Mappa do Estado do Parana: R. Martins, 477 †
Paris—
Carte Internationale du Monde au Millionème, Conference at Paris, 1913..178
Parizeau, H. D., Report on Survey work in James Bay, Hudson Bay, 340
Parkinson, J., Geological structure of West Africa, 467 †; Handbuch der regionalen Geologie. English Colonies on West coast of Africa and Liberia, 594 †
Parr, A. A. C., obituary, 450
Passarge, S., Physiogeographie und Vergleichende Landschaftsgeographie, 598 †; Physiologische Morphologie, 424 §; Trockengebiete Algeriens, 465 †
Patagonia—
Desiccation in, 317
Interozeanische Wasserscheide in Patagonia: R. Hauthal, 595 †
Pampa and other formations in Patagonia: E. G. Fenton, 469 †
Toponymie historique des côtes de la Patagonie: P. Groussac, 219 †
Patricia District, Northern Canada, 444
Pavie, M., Indo-Chine. Carte de la mission Pavie, 358 †
Pawlowski, St., Eisverhaltnisse der oberen Weichsel, etc., 461 †
Peach, B. N., and others, Geology of Fannich Mountains, 714 †
Peacock, H., Report on land settlement of Gezira, 103 †
Pease, Sir A. E., Book of the lion, 105 †
Peck, A. S., First ascent of stately Coropuna, 595 †
Peignot, A. M., Notice sur la subdivision de Zigueï, 103 †
Peixotto, E., Pacific shores from Panama: 354 †
Pekin—
Annals and memoirs of Courts of Pekin: E. Backhouse and J. O. P. Bland, 464 †
Pemba, spice island of Zanzibar: J. E. Craster, 432 §
Penck, A., Medal awarded to, 690
Peninsula—
Che cosa si debba intendere per penisola: G. Azzi, 222 †
Pennell, A. M., Pennell of Afghan frontier; life of Theodore L. Pennell, 598 †
Pennell, Commander, award to, 690
Pennell, Theodore L., Life of: A. M. Pennell, 598 †
Pennines—
Population changes on slopes of Southern Pennines, 35
Pennsylvania—
Buried valley of Susquehanna river: N. H. Darton, 717 †
Parks, Sir R. W., Georgian Bay Ship Canal, 695
Perret, F. A., Report on recent great eruption of Stromboli, 592 †
Perret, R., Geographie de Terre Neuve, 467 †
Perry-Ayscough, H. G., and R. B. Otter-Barry, With the Russians in Mongolia, 464 †, 683 §
Persia—
Index to names appearing on Southern Persia sheet of Southern Asia series (Survey of India), 103 †
Journey through Azerbaijan and Persian Khurdistan: M. P. Price, 464 †
Persien-Expedition: O. Niedermayer, 715 †
Peru—
Diccionario Politico-geografico del Perú, 1909: C. B. Cisneros, 469 †
Maps: El Peru en 1913 (Sociedad Geog. de Lima), 229 †
Petróleo en el Perú, Industria del; J. V. Jiménez, 595 †
Photographs: F. A. Corry, 364 †
Porvenir de la industria del jebe en el Perú: E. Castre, 469 †
Yale University and National Geographic Society Peruvian Expedition: H. Bingham, 676
Pesegem tribe, New Guinea, 269
Peßler, W., Hausgeographie des Wilster Marsch, 592 †
Peterborough—
Buried (East-Mercian) river channel near Peterborough, Note on: A. Irving, 214 †
Petersen, C. G., Note on construction of Map of Siachen glacier, 140
Petterson, O., Atlantische Ozean während der Eiszeit, 721 †; Einige Bemerkungen

zu G. Schotts 'Geographie des Atlantischen Ozeans,' 597 †; Om klimatvariationer i Europa under historisk tid och deras orsaker, 711 †
Pettman, C., Africanderisms, 352 †
Peucker, K., Colour scheme for maps, 243; Staaten der Balkanhalbinsel mit Teilen von Oesterreich-Ungarn, etc., 473 †; Theodor Scheimpflug, 472 †
Peytier, E., Nouvelle description geometrique de la France, 107 †
Philip, G. (*see also* Muir, R.), Modern School Atlas of Comparative Geography, 362 †
Philip's Chamber of Commerce Atlas, 603 †; Philip's model set of surveying apparatus for schools, Notes and directions for use of: J. Fairgrieve, 105 †
Philippi, H., Vulkaan G. Sëkintjau in Benkoelen, 103 †
Philippines—
Davas District, Wild tribes of: F.-C. Cole, 715 †
Kapok industry: M. M. Saleeby, 517 †
Non-Christian peoples: Dean C. Worcester, 715 †
Philippson, A., Mittelmeergebiet, 101 †; Oestliche Mysien und benachbarten Teile von Phrygien und Bithynien, 465 †; Vulkangebiet von Kula in Lydien, 465 †
Phillips, G., On loss of water due to evaporation, etc., 355 †
Photographic Exposure Record and Diary, 1913 and 1914: Wellcome, 225 †, 599 †
Photographic Survey—
Fotogrammetrisk kartläggning: H. Byström, 221 †
Photographs—
Africa Protectorate, East: J. P. Clark, 480 †
Alps: Miss M. S. Johnston, 728 †
Arabia: G. E. Leachmann, 480 †
Australia, Federal Capital Territory: Messrs. Howard and Sheersby, 363 †
Baluchistan: E. Zugmayer, 728 †
China, Southern: M. H. P. Destelan, 364 †
Crater Lake on Mount Elgon: G. Harley, 729 †
Himalayas: V. Sella, 115 †; ditto: J. B. Noel, 729 †
India, Dibang Exploration Survey: C. P. Gunter, 115 †
Kashmir, Wardwan valley: Miss K. I. Lillington, 729 †
Mesopotamia, Lantern slides of: H. E. Weber, 231
Mishmi Country: F. K. Hensley, 730 †
New Guinea, Dutch: H. A. Lorentz, 232; ditto: A. F. R. Wollaston and C. B. Kloss, 729 †
New Zealand, North Island: H. O. Frind, 115 †
Nigeria-Kamerun Boundary Commission: W. V. Nugent, 730 †
Photographs—*continued.*
Olympic Mountains, Washington: H. Appleton, 364 †
Orange river: A. W. Rogers, 730 †
Peru: F. A. Corry, 364 †
Rajputana, Lantern slides of: E. W. Mellor, 232 †
Spitsbergen and Bear island: R. C. Morrell, 480 †
Tahiti, Captain Cook's observation mark at Matavai: B. G. Corney, 364 †
Thebes, Egypt: Miss M. S. Johnston, 729 †
Vancouver Islands, West Coast: H. O. Frind, 116 †
West Indian Scenery: F. Alcock, 116 †
Physiographical Notes. II., On the Taming of Streams: G. W. Lamplugh, 651*
Physiography—
Realm of Nature; an outline of physiography: H. R. Mill, 105 †, 334 §
Physiological Morphology: S. Passarge, 425 §
Piedmont: E. Canziani and E. Rohde, 213 †
Pierce, C. H.: *see* Leighton, M. O.
Platania, G., Intorno ad alcune sorgenti termali nelle isole Eolie, 101 †
Plumb-line Deflection in North India, 692
Po river—
Fossa angusta o fossa Augusta: D. Pantanelli, 101 †
Navigation on, 440
Precipitazione media nel bacino del Po: G. Anfossi, 101 †
Pointe Noire, Gabun, Longitude of, 444
Polar Commission—
Commission Polaire Internationale Procès-Verbal de la session tenue à Rome en 1913: G. Lecointe, 719 †
Polynesian wanderings: W. Churchill 596 †
Ponce de Leon, J., Discovery of Florida: L. D. Scisco, 340
Ponte, G., Sulla independenza delle acque sotterranee dell' Etna dalle precipitazioni atmosferiche, 101 †
Porsild, M. P., Zur Kenntnis des photochemischen Klimas der Arktis, 719 †
Port Phillip—
Colony at Port Philip in Bass's Strait, Account of voyage to establish: J. K. Tuckey, 107 †
Work of Captain Matthew Flinders in Port Phillip: T. W. Fowler, 220 †
Ports—
Typen per Verkehrslagen am Meer: F. Falkenstein, 722 †
Types de ports: I. Asada, 223 †
Portugal—
Maps: Carta dos Arredores de Lisboa, 600 †
Voyage d'études géobotaniques au Portugal: R. Chodat, 714 †
Pott, M., Aardrijkskundig Woordenboek van Nederland, 100 †

Powers, S., Floating Islands, 582, 720 †
Praeger, R. L., On buoyancy of seeds of some Britannic plants, 593 †
Pratas island, China sea, Fire by friction of bush branches in: T. J. Eldridge, 448
Price, M. P., Journey through Azerbaijan and Persian Khurdistan, 464 †
Priestley, R. E., Work and Adventures of Northern Party of Captain Scott's Antarctic Expedition, 1910–13..1 *
Prince Charles Foreland, Spitsbergen, Map of: W. S. Bruce and J. Mathieson, 113 †
Prindle, L. M., and others, Geologic reconnaissance of Fairbanks Quadrangle, Alaska, 353 †
Pritchard, B. E. A., Journey from Myitkyina to Sadiya viâ N'Mai Hka and Hkamti Long, 521 *
Projection (*see also* Maps)—
Land Map of World on new Projection: B. J. S. Cahill, 86 §, 221 †
Property, Origin of, and formation of village community: J. St. Lewinski, 356 †
Przybyllok, E., Bericht über die Jätigkeit nach Verlassen von Südgeorgien, 470 †
Ptolemy's Geography of South-Eastern Asia: A. Herrmann, 579
Ptolemy's Maps, History of: P. Dinse, 566
Pullé, G., Brevi note antropogeografiche sulle Valli Grande e d'Intragna, 101 †
Purey-Cust, H. E., remarks on "Relief in Cartography," 402
Purnell, C. J.: *see* Wright, C. T.
Putsche, P., Kritischer Böschungswinkel und kritische Tiefe, 721 †
Pyrenees—
Irrigation au sud des Pyrénées: Baron de Contenson, 714 †
Pyrénées Méditerranéennes: M. Sorre, 188 §
Transpyrénéens et relations franco-espagnoles: A. Sauzède, 714 †

Q.

Quebec—
Géologie et flore des terrains désertiques aux environs de St. Jérôme: Frère Marie-Victorin, 467 †
Queen Mary peak, Karakoram, 133
Queensland—
Mein Telegraph Station, From the, to Lloyd's Bay: J. Dick, 354 †
Quervain, A. de, Quer durch Grönlandeis, 221 †, 689 §
Quiggin, E. C., Essays and studies presented to William Ridgeway on his 60th birthday, 224 †

R.

Rabot, C., et P. L. Mercanton, Variations périodiques des glaciers, 721 †
Raeside, Lake, Westralia, 661
Raffenel, A., Nouveau voyage dans le pays des nègres, 106 †; Voyage dans l'Afrique Occidentale, 1843 et 1844.. 106 †
Rainfall—
Earthquakes and Rainfall: R. W. Sayles, 223 †
Reservoirs and water supply: Sir A. R. Binnie, 332 §
Rajputana—
Lantern slides of Rajputana: E. W. Mellor, 232 †
Ramsay, J. A., Use of place-names in teaching of geography, 225 †
Rand, McNally & Co., Indexed Pocket Maps of United States, 111 †, 603 †, 727 †
Rasmuss, H., Zur morphologie des nordwestlichen Böhmen, 461 †
Ravenna, a study: E. Hutton, 72 §
Rawling, C. G., remarks on "An expedition to Dutch New Guinea," 272
Reboul, P.: *see* Kilian, W.
Reche, O., Ethnographie des Abflusslosen Gebietes Deutsch-Ostafrikas, 594 †
Red sea—
Desert and water gardens of Red Sea: C. Crossland, 103 †, 327 §
Regel, F., Argentinien, 353 †
Reid, F. B., Precise levelling, 467 †
Reid, Robert L., obituary, 704
Reid, W. A., Railways of South America, 595 †
Renaissance, English travellers of the: C. Howard, 356 †
Resection, Notes on: T. L. Bennett, 221 †
Reuning, E., Karte des Küstengebietes zwischen Hottentottenbucht und Empfängnisbucht, 359 †
Reuter, C., Ostseehandel in früheren Zeiten, 461 †
Revelli, P., Geografia nel Cinquecento, 722 †
Reviews—
Abyssinia. Au Pays Ghimirra: G. Montandon, 430
Africa, Central: Winning a Primitive People: D. Fraser, 328
Africa. South African Scene: V. R. Markham, 430
Africa Tribe, South, Life of: H. A. Junod, 324
Africa, West, Languages of: F. W. Migeod, 431
African Pioneer, South, Further Reminiscences of: W. C. Scully, 688
Afrique Equatoriale, Sociétés Primitives de l': A Cureau, 572
Agassiz, A., Letters and Recollections of: G. R. Agassiz, 437
America, Central and South, Republics of: C. R. Enock, 434
America. Erste Entdeckung Amerikas im Jahre 1000 n. Chr.: G. Neckel, 329
America, North, Early Norse Visits to: W. H. Babcock, 194

Reviews—*continued.*
Anglo-Saxon Settlements, Archæology of: E. T. Leeds, 322
Animal geography: M. T. Newbigin, 197
Archipel de la Manche: C. Vallaux, 323
Argentinien in geographischer geschichtlicher und wirtschaftlicher Beziehung, 435
Asia; a Geography Reader: E. Huntington, 199
Asia. Vorderasienexpedition 1906 und 1907: H. Grothe, 72
Atlas Geographies: T. Franklin and E. D. Griffiths, 197
Austral-African Notes and Anecdotes: A. J. Tremearne, 329
Australia from a Woman's Point of View: J. Ackermann, 436
Basuto, History of: F. Ellenberger and J. C. Macgregor, 192
Big Game Shooting in India, etc.: V. M. Stockley, 74
Black Ivory and White: H. C. Jackson, 431
Bornu, Sultanate of: A. Schultze and P. A. Benton, 685
Bradford, Story of: M. Law, 71
Brazil, Twentieth-Century Impressions of: R. Lloyd and others, 75
Burma under British Rule: J. Dautremer, 73
Canada and Newfoundland. Visual Instruction Committee Handbooks: A. J. Sargent, 575
China Revolutionized: J. S. Thompson, 323
China un Tibet, Wissenschaftliche Ergebnisse des Expedition Filchner nach, 569
Coast Erosion and Protection: E. R. Mathews, 323
Cochin Tribes and Castes: L. K. Ananthá Krishna Iyer, 568
Columbia: P. J. Eden, 688
Colombie, Voyage en: F. Serret, 575
Comparative Geography of Six Continents: E. W. Heaton, 576
Congo, Histoire de l'Etat Indépendant du: F. Masoin, 687
Contours and Maps explained and illustrated: F. Morrow, 333
Crete, Camping in: A. Trevor-Battye, 323
Desert and Water Gardens of Red Sea: C. Crossland, 327
Desert, Conquest of the: W. MacDonald, 685
Egypt in Transition: S. Low, 687
Egyptian Irrigation: Sir W. Willcocks and J. I. Craig, 573
Energy, Natural Sources of: A. H. Gibson, 576
Eskimo, My life with: V. Stefánsson, 432
Europe and the Far East, 1506–1912: Sir R. K. Douglas, 74
Reviews—*continued.*
Europe, Continent of: L. W. Lyde, 68
Fiords, Nature and Origin of: J. W. Gregory, 329
France, Divisions Régionales de: C. Bloch and others, 71
France, géographie Illustrée: P. Jousset, 71
Geography, Commercial, of World: O. J. R. Howarth, 197; Part II.: A. J. Herbertson and J. Cossar, 439
Geography, Deductive Exercises in, Europe: C. R. Dudley, 198
Geography, Elementary, of Scotland: M. I. Newbigin, 197
Geography of British Empire: W. L. Bunting and H. L. Collen, 197
Geography, Preliminary: E. G. Hodkinson, 576
Geography, Principles and Methods of Teaching: F. L. Hölzt, 438
Geography, Questions and Exercises in: R. J. Finch, 576
Geography, Text-book of: R. M. Munro, 199
Greenland. Danmark-Ekspeditionen til Gronlands Nordostkyst. Hydrographical Observations: A. Trolle, 195
Grönlandeis, Quer durch: A. de Quervain, 689
Hannibal once more: D. W. Freshfield, 679
Haut-Sénégal-Niger: J. Meniaud, 326
Hellas and the Balkan Wars: D. J. Cassavetti, 323
Holy Land, Camera Crusade through: D. L. Elmendorf, 74
India and the Indians: E. F. Elwin, 74
India, Colloquies on Simples and Drugs of India: G. da Orta, 684
Islands grösster Vulkan: H. Spethmann, 682
Italy in North Africa: W. K. McClure, 328
Japan's Inheritance, 428
Juif Errant d'aujourdhui: L. Hersch, 196
Kashmir, Thirty Years in: A. Neve, 429
Livingstone and Newstead: A. Z. Fraser, 77
McKinley Mount, Conquest of: B. Brown, 574
Madras, Old, Vestiges of: H. D. Love, 73
Madras Presidency: E. Thurston, 682
Mexico; Land of Unrest: H. Baerlein, 575
Mongolia, Unknown: D. Carruthers, 189
Mongolia, With the Russians in: H. G. Perry-Ayscough and R. B. Otter-Barry, 683
Mountains; their Origin, Growth, and Decay, 689
Nature, Realm of: H. R. Mill, 334

Reviews—*continued.*
New Madrid Earthquake: M. L. Fuller, 192
Nubia, Archæological Survey of: C. M. Firth, 324
Ottoman Empire, 1801–1913: W. Millar, 334
Pacific, Western, Two Years with Natives in: F. Speiser, 435
Pemba; Spice Island of Zanzibar: J. E. Craster, 432
Pyrénées Méditerranéennes: M. Sorre, 188
Rainfall Reservoirs and Water Supply: Sir A. R. Binnie, 332
Ravenna, a study: E. Hutton, 72
Rhodésie, Lois et l'administration de la: H. Rolin, 191
Russia, Modern: G. Alexinsky, 427
Schweiz, Landeskunde der H. Walser, 680
Scotland, Historical Geography of: W. R. Kermark, 428
Scythians and Greeks: E. H. Minns, 76
Sicily, Vistas of: A. S. Riggs, 72
Somali Book, My: A. H. E. Mosse, 686
Thames Country, Upper, and Severn-Avon Plain: N. E. MacMunn, 428
Town-planing, Ancient: F. Haverfield, 334
Uganda, Handbook of: H. R. Wallis, 686
United States, Cotton Manufacturing Industry of: M. T. Copeland, 433
Yorkshire, North-Eastern, Moorlands of: F. Elgee, 321
Yakutat Bay, Earthquake at, September, 1899: R. S. Tarr and L. Martin, 192
Reynolds-Ball, E., Cairo of To-day, 593 †
Rhine—
Löss und Schotterlehm im Niederrheinischen Tiefland: W. Wunstorf, 714 †
Rhinoceros, The White: E. Heller, 351 †
Rhodesia—
Lois et L'Administration de la Rhodésie: H. Rolin, 191 §
Maps: Southern Rhodesia (Surveyor-General), 602 †
Ruins in Rhodesia, Appointment of R. N. Hall as Government Curator, 580
Riabinin, A., Sur la structure géologique de la chaîne de Cahétie, 215 †
Ribbe, C., Sammelaufenthalt in Neu-Lauenburg, 718 †
Riadh, Arabia, 515, 517
Ricchieri, G., Luigi Hugues, 224 †; Più recenti cognizioni e ipotesi sulle condizioni dell' interno della terra, 355 †
Rice, H., Medal awarded to, 690
Ricek, L. G., Nieder-Osterreich in Zeitalter der Reformation (Map), 599 †
Richter, W., Kinematograph als Vermittler geographischer Bildung, 598 †
Rickmers, W. R., Alai-Pamirs Expedition of German and Austrian Alpenverein, 182
Ricou, E., Monographie du Srok de Chong-Kal, 464 †
Ridgeway, W., Essays and studies presented to, on his 60th birthday: E. C. Quiggin, 224 †
Ridley, H. N., and C. B. Kloss, Expedition to Mount Menuang Kasing, Selangor, 201 §, 351 †
Riggs, A. S., Vistas of Sicily, 72 §
Rikli, M., Natur- und Kulturbilder aus den Kaukasusländern und Hocharmonien, 215 †; and E. Rübel, Vegetationsbilder aus dem westlichen Kaukasus, 215 †
Riverina, The: J. C. H. Ogier, 220 †
Rivers—
Cours d'eau, Note sur l'évolution du lit des cours d'eau: M. J. Blache, 721 †
Physiographical Notes, II. On the taming of Streams: G. W. Lamplugh, 651 *
Zusammenstellung von Zahlen für die Wasserführung der Flüsse: L. Henkel, 721 †
Rivet, P.: *see* Crequi-Montfort, G. de
Riviera—
Riviera, Die: A. Voigt, 213 †
Robbins, W. W.: *see* Hewett, E. L.
Robert, M.: *see* Deladrier, E.
Robertson Bay, South Victoria Land, 2
Robinson, Sir T. B., remarks on "Evolution of a Capital," 552
Robitzsch, M., Sonnenscheinregistrierungen auf Spitzbergen, 719 †
Rockhill, Hon. W. W., Notes on relations and trade of China . . . during Fourteenth Century, 714 †
Rocks, Igneous, and their origin: R. A. Daly, 597 †
Rocks, Wearing down of: J. W. Evans, 720 †
Rogers, A. W., Photographs of Orange River, South Africa, 730 †
Rohde, E.: *see* Canziani, E.
Rohmeder, W., Gebrauch deutscher Ortsnamen in Welschtirol, 711 †
Rolin, H., Lois et l'administration de la Rhodésie, 191 §
Roncagli, G., Per la cartografia æronautica, 719 †
Roorbach, G. B., Fault-block topography of Mohawk valley, 218 †
Roosevelt dam and Salt River Valley: H. H. Barrows, 218 †
Roosevelt, Mr., Journey in South America, 697
Roper, W. J., Falkland Islands, 354 †
Rose or Siachen Glacier, 117; Notes on its having been an old time Route to Nubra or Chinese Turkestan, 138
Rosenmüller, M., Bernhard Hantzsch und seine letzte Forschungsreise in Baffinland, 722 †
Rosenthal, E., Ueber die Tiefenbestimmung von Erdbebenherden, 722 †

Ross, E. D.: *see* Csoma de Körös, A.
Ross, M., A climber in New Zealand, 469 †
Ross barrier and glacier ribs, 619
Roth, M., Norden (Map), 226 †
Rothaug, J. G., Karte des naturlichen Vegetations- u. Wirtschaftsgebiete der Erde, 727 †; Physische Schulwandkartes, 725 †; Vaterländischer Geographischer Schulatlas, 727 †; and F. Thoms, Wirtschaftskarte der Oesterr. Sudetenlander, 723 †
Rothaug, R., Wandtafeln zur Geographie Europas, 725 †
Roussel, A., Fuégiens, leur mœurs et leur langage an XVII^me siècle, 595 †
Roussilhe, H., Mission hydrographique Congo-Oubangui-Sanga, 204 §, 352 †
Routledge, W. S., Survey of Desolation Island, Straits of Magellan, 446
Roux, C. A., Grenoble. Cours Berriat, Etude géographique d'une rue, 711 †
Royal Geographical Society—
Awards for 1914..690
Grant towards Sir E. Shackleton's Trans-Antarctic Expedition, 178
Lectures to Young People, 212
Library, Older works added in 1913.. 106
Meetings, Session 1913-1914..98, 212, 348, 459, 590, 709
Royal Society of London, Celebration of Two Hundred and Fiftieth Anniversary of, 106 †
Rózsa, M., Periodische Entstehung-doppelter Temperaturmaxima in den warmen Salzseen, 597 †
Rübel, E.: *see* Rikli, M.
Rüdiger, H., Die Sorge-Bai, Aus den Schicksalstagen der Schröder-Stranz-Expedition, 105 †
Rudolph, E., and S. Szirtes, Erdkarte in mittabstandstreuer Azimutalprojektion, 603 †; Nomographische Bestimmung der Epizentrums, 598 †
Rübl, A., Geopsychologie, 471 †; Hafen von Newport News, 717 †
Ruiters, D., Toortse der zee-vaert, 224 †
Rumania—
Frontier between Bulgaria and Rumania, 559
Nouveau territoire Roumain: M. C. A. Berindei, 714 †
Rumma, Wadi, Arabia, 512
Russia—
Canals and Internal Navigation in Russia: R. Hennig, 577
Handel und Industrie im Europäischen Russland: A. Wocikow, 592 †
Maps: Hydrographical Charts (Ministry of Marine), 115 †; Railways, Waterways and Roads of European Russia (Ministry of Ways of Communications, 108 †, 600 †; Southern Frontier Regions of Asiatic Russia (Military Top. Dept.), 476 †, 726 †; Wall map of Asiatic Russia: A. M. Gowjagin, 725 †
Russia—*continued.*
Modern Russia: G. Alexinsky, 427 §
Russian Hydrographical Expedition to North of Siberia, 64
Russian Surveys in India, 665
Ruthven, A. G., Local distribution of reptile-amphibian fauna in Southern Vera Cruz, 217 †
Ruxton, U. F. H., remarks on "Geographical Results of Nigeria-Kamerun Boundary Commission," 650
Ryan, J. C., Health preservation in West Africa, 467 †

S.

Sachse, P. W., Lengte van Paramaribo, 219 †
Saderra Masó, M., Earthquakes in the Philippines, 695
Sadiya, Journey from Myitkyina to, *viâ* N'mai Hka and Mkamti Long: B. E. A. Pritchard, 521 *
Sagunaki mountain, Peter the Great range, 182
Sahara—
Transsaharien, son utilité: A. Souleyre, 104 †
Sainsbury, E. B., A calendar of Court minutes, etc., of East India Company, 215 †
Saint-André, L. de, Sur la frontière Tonkinoise, 464 †
Saint-Jours, B., Fixité de la Côte landaise, 350 †
St. Lawrence—
Currents in entrance to the St. Lawrence (Dept. of Naval Service), 467 †
Highways and byways from St. Lawrence to Virginia: C. Johnson, 218 †
Origin of Gulf of St. Lawrence: J. M. Clarke, 467 †
St. Petersburg and its environs: O. Keller, 101 †
Sakhalin—
Von Ural bis Sachalin: O. Goebel, 351 †
Sakura Shima volcano, Japan, Eruption of, 202, 678
Saleeby, M. M., Kapok industry, 715 †
Saleib tribe, Arabia, 502
Salembier, L., Pierre d'Ailly et la découverte de l'Amérique, 218 †
Salingens, Simon van, Karta Öfver Norden 1601: E. G. Palmén, 356 †
Salisbury, E. J.: *see* Oliver, F. W.
Saltoro—
Name Saltoro, note on: G. P. L. Conyngham, 692
Saltoro pass, Karakoram, 119, 142
Sampson, F. A., New Madrid and other earthquakes of Missouri, 218 †
Sandström, J. W., Meteorologiska forskningsresor i de svenska fjalltrakterna, 214 †
Sanfilippo, I., Missione mineralogica italiana nelle Tripolitania, 717 †

Santa Ysabel, Fate of: L. Hargrave, 581
Sapper, K., Experiment in der physikalischen Geographie, 598 †; Matavanu auf Savaii im Jahre 1912..469 †; Mittelamerikanische Vulkane, 469 †
Sarasin, F., Neu-Caledonien, 469 †; Voyage en Nouvelle-Calédonie, 718 †
Sardinia—
Barbagia in Sardinien: M. L. Wagner, 592 †
Sargent, A. J., South Africa. Seven lectures prepared for Visual Instruction Committee of Colonial Office, 466 †; Visual Instruction Committee Handbooks. No. 4. Canada and Newfoundland, 575 §
Sauzède, A., Transpyrénéens et les relations franco-espagnoles, 714 †; Voies ferrées transbalkaniques, 711 †
Savaii—
Matavanu im Jahre 1912: K. Sapper, 469 †
Savigny, J. B., and A. Correard, Narrative of a voyage to Senegal in 1816.. 106 †
Sawicki, L. R. v., Einfluss des geographischen milieus auf die rassiale und kulturelle Entwicklung Abessiniens, 465 †
Sayles, R. W., Earthquakes and rainfall, 223 †
Scandinavia—
Geologie, Regionalen, Handbuch der, Fennoskandia: A. G. Högbom, 592 †
Maps: Norden: M. Roth, 226 †
Schee, —, Nordwestlichen Gebiete Deutsch-Ostafrikas, 216 †
Scheimpflug, Theodor (Biography): K. Peucker, 472 †
Scheu, E., Rias von Galicien, ihr Werden und Vergehen, 592 †
Schiaparelli, E., Geografia dell' Africa Orientale, 352 †
Schlee, P., Zur Morphologie des Berner Jura, 593 †
Schleswig—
Lakes of diluvial deposits of Schleswig: G. Wegemann, 439
Schleswigschen Diluvialseen und ihre Kryptodepressionen: G. Wegemann, 439 §, 592 †
Schleswig-Holstein—
Hausgeographie von Dithmarschen: O. Lehmann, 592 †
Hausgeographie des Wilster Marsch: W. Pessler, 592 †
Physikalischen Geographie . . . des Schleswig-Holsteinischen Sandr-(Geest-) Gebietes: H. Fürchtenicht-Boening, 591 †
Schlosser, P., Beiträge zur historischen Geographie des Bachern gebirges in Südsteiermark, 461 †
Schmid, F., Geographische . . . Bedeutung des Waldes, etc., 720 †
Schmidt, M., Reisen in Matto Grosso im Jahre 1910.. 219 †
Schmidt, M. G., Natur und Mensch, 471 †
Schmidt, W., Südwestliche Arabien, 350 †, 465 †; und C. Grotewold, Argentinien in geographischer, geschichtlicher Beziehung, 435 §
Schoff, W. H., Latin American railways, present and projected, 353 †
Schönebeck, A., Khalkha, 103 †
School and College Atlas: G. W. Bacon & Co., 727 †
Schoy, C., Gegenazimutale mittabstandtreue Karte in konstruktiver und theoretischer Behandlung, 719 †; Theoretische Ermittlung des günstigsten Neigungswinkels für die Erwärmung einer Berghalde, 471 †
Schrader, F., L'Année Cartographique, 230 †
Schuchhardt, C., Westeuropa als alter Kulturkreis, 593 †
Schück, A., Zur Entwicklung des "Jakobsstabes," 719 †
Schultze, A., and P. A. Benton, Sultanate of Bornu, 216 †, 685 §
Schumacher, —, Vulkanische Ausbruch im Norden des Kiwu-Sees, 352 †
Schwartz, —, et — Villatte, Mission d'abornement Liberia, Guinée Côte d'Ivoire, 467 †; Sur la première détermination de différence de longitude par télégraphie sans fil en Afrique occidentale française, 103 †
Scisco, L. D., Ponce de Leon's Discovery of Florida, 340
Sclater, Philip L. (Biography): A. H. Evans and others, 472 †
Scoresby, W., My father, being records of Adventurous life of late William Scoresby, 106 †
Scotland—
Artificial islands in Lochs of Highlands of Scotland: R. Munro and others, 214 †
Geography in Scotland since 1889: M. J. Newbigin, 593 †
Historical Geography of Scotland: W. R. Kermack, 428 §
Scott, R. F., Antarctic Expedition, Exhibition of Collections of, 88; Chatham Memorial to, 585; Journals of, placed in British Museum, 210; Memorial to, at Lautarets and London, 342, 343; 'Scott's Last Expedition,' Review on, 16
Scrivenor, J. B., Geological history of Malay Peninsula, 103 †
Scruggs, W. L., Venezuelan question, 106 †
Scully, W. C., Further Reminiscences of a South African Pioneer, 688 §
Scythians and Greeks: E. H. Minns, 76 §
Sea-level, Rise and fall of, 702
Seckt, H., Vegetationskarten aus dem Nordwesten Argentiniens, 602 †
Seiner, F., Deutsche Zone des Okavango (Map), 228 †; Ergebnisse einer

Bereisung der Omaheke in 1910–1912.. 466 †
Seismology—
Modern Seismology: G. W. Walker, 355 †
Selangor—
Expedition to Mount Mĕnuang Gasing: H. N. Ridley and C. B. Kloss, 201 §, 351 †
Selkirk mountains, Ascent, First, of Mount Sir Sandford: H. Palmer, 467 †
Sella, M., Pesca della spugne nelle Libia, 217 †
Sella, V., Photographs of Himalayas taken in neighbourhood of Kangchenjunga, 115 †
Semple, Miss E. C., Honour to, 700
Senegal—
Haut-Sénégal-Niger: J. Meniaud, 326 §
Maps: Carte du Senegal (Service Géog. de l'Afrique Occidentale Française), 602 †
Voyage to Senegal in 1816, Narrative of: J. B. H. Savigny and A. Correard, 106 †
Senussi Mecca at Jarabub, 338
Serat, Yemen, 66
Serret, F., Voyage en Colombie, 1911–1912.. 575 §
Servia—
Frontier between Bulgaria and Servia, 559
Seydlitz, W. von, Kaledonischen Deckengebiets Schwedisch-Lapplands, 593 †
Shackleton, Sir E., Antarctic Expedition, Government support for, 448; Imperial Trans-Antarctic Expedition, 1914.. 173 *, 318 *; Shackleton in the Antarctic, 1907–1909.. 355 †
Shackra, Arabia, 514
Shaw, W. N., remarks on "Is the Earth drying up?" 313
Shebshi mountains, Nigeria, 634
Sheep—
Geographical Distribution of Wild Sheep: R. Kowarzik, 699 §, Map, 603 †
Shingle, Fixation of, by Vegetation: F. W. Oliver and E. J. Salisbury, 577
Shipping—
Schiffbesitz und Schiffbau in geographischer Verbreitung: A. Oppel, 472 †
Shokalsky, J. de, Proposition for improvements in map making, 210; Recent fall in level of Caspian, 691; Russian Hydrographical Expedition to North of Siberia, 64 *
Shore-lines, Contraposed: C. Clapp, 720 †
Siachen glacier—
Exploration of Siachen or Rose Glacier: F. B. Workman, 117 *
Length and meaning of name, 123
Note on construction of Map of: C. G. Peterkin, 140
Physical Characteristics of Siachen Basin and Glacier System: W. H. Workman, 273 *
Siam—
Durch König Ischulalongkorns Reich: C. C. Hosseus, 215 †
Survey Dept., Royal, General Report on operations of, 465 †
Siberia—
Chemin de fer de Sibérie, Explorations géologiques et minières le long du, 215 †
Russian Hydrographical Expedition to North of Siberia: J. de Shokalsky, 64 *
Sea Route to Siberia. I. The Voyage: J. Lied, 481 *; II. On Ice Conditions and Possibility of Regular Navigation: F. Nansen, 488 *
Vom Ural bis Sachalin: O. Goebel, 351 †
Sicily—
Earthquake of May, 1914.. 679
Vistas of Sicily: A. S. Riggs, 72 §
Sieger, R., Bosnisch-herzegovinische Bahnproblem, 461 †
Sierra Leone—
Frontier demarcation between French Guinea and Sierra Leone, 203
Silesia—
Schlesische Landeskunde: F. Frech and F. Kampers, 100 †
Simony, F., Dachsteingebiet, 106 †
Simpson, R. R.: *see* Ball, V.
Sinai—
Desert of Sinai; H. Bonar, 106 †
Skardu, Baltistan, 33
Skeat, W. W., Etymological dictionary of English Language, 598 †
Smith, W. D., Geology of Luzon, 103 †
Smithsonian Institution, Explorations and field work in 1912.. 225 †
Smyth, R. B, Victoria, Geological Survey. Report of progress, 107 †
Snow-line—
Dépression der eiszeitlichen Schneegrenze: F. Machachek, 721 †
Snowy mountains, or Nassau range, Dutch New Guinea, 248
Soane, E. B., Grammar of Kurmanji or Kurdish Language, 593 †
Soil—
Bodenbildung und Klima, Beziehungen zwischen: H. Fischer, 471 †
Bodenversetzung in den Tropen: W. Volz, 471 †
Solar radiation—
Astrophysical Observatory of Smithsonian Institution, Annals of: C. G. Abbot and others, 355 †
Solarkonstante und ihre Schwankungen: C. G. Abbot and others, 355 †
Solomon islands—
La Pérouse, Loss of: C. M. Woodford, 581
Somaliland—
Big Game Shooting in India, Burma, and Somaliland: V. Stockley, 74 §
My Somali book: A. H. E. Mosse, 216 †, 686 §

Sonkwala mountains, Nigeria-Kamerun boundary, 644
Sorre, M., Pyénées Méditerranéennes, 188 §
Souleyre, A., Transsaharien ; son utilité, 104 †
Southampton—
Harbour Commission, Report, 214 †
Southampton Island, Additions to Captain Comer's map of, 104 †
South Georgia—
Geological Relations of South Georgia : J. W. Gregory, 719 †
Geology of : D. Furguson, 719 †
South Orkneys—
Argentine station for meteorological observations, 341
South Sea Savage, Ways of the : R. W. Williamson, 596 †
South Seas, Through the, with Jack London : M. Johnson, 596 †
Spain—
Bordure meridionale de la Meseta Ibérique : J. Groth, 213 †
Castañedasee, der grösste Süsswassersee Spaniens : W. Halbfass, 200 §, 714 †
Maps: Mapa Militar Itinerario de España (Deposito de la Guerra, Madrid), 108 †
Unbekannten Spanien, Aus den : W. Halbfass, 592 †
Speerschneider, C. I., State of ice in Arctic seas, 1912..221 †
Speight, R., Redcliff gully, Rakaia river, 220 †
Speiser, F., Südsee, Urwald, Kannibalen, 104 † ; Two Years with Natives in Western Pacific, 435 §
Spencer, J. W., Relationship between terrestrial gravity and observed earth-movements of Eastern America, 217 †
Spencer, W. B., Preliminary report on aboriginals of Northern Territory, 718 †
Spethmann, H., Islands grösster Vulkan, 682 § ; Wasserhaushalt der Ostsee, 461 †
Spitaler, R., Eiszeiten und Polschwankungen der Erde, 720 †
Spitsbergen—
Expedition in 1913 by H. Stoll, 584
Expédition Isachsen au Spitsberg 1909–10, Rapport sur : G. Isachsen, 221 †
Glaciation au Spitsberg, Influence du sol sur : L. Vegard, 221 †
"Guipa" Höhle in der Crossbai Spitzbergens : K. Wegener, 470 †
Hafsvattnets slamhalt inom Spetsbergens Isfjord ur geografisk synpunkt : S. De Geer, 719 †
Hydrographic observations of Isachsen Spitsbergen Expedition : G. Isachsen, 221 †
Ice conditions in 1912..209
Karbonablagerungen des westlichen Spitzbergens : O. Holtedahl, 221 †
Maps: Prince Charles Foreland : W. S. Bruce and J. Mathieson, 113 †
Spitsbergen—*continued.*
Spitsbergen (Norges Geografiske Opmaaling), 115 †
Photographs of Spitsbergen and Bear island : R. C. Morrell, 480 †
Schröder-Stranz Expedition, 209 ; Schröder-Stranz-Expedition, Aus den Schicksalstagen der : H. Rüdiger, 105 † ; Schröder-Stranz Expedition, Deutsche Wissenschaftliche Station auf Spitzbergen und die, H. Hergesell und K. Wegener, 470 †
Sonnenscheinregistrierungen auf Spitzbergen : M. Robitzsch, 719 †
Sprigade, P., H. Nubiling and M. Groll, Karte des Deutsch-Portugiesischen Grenzgebiete in Südwestafrika, 228 †
Stampalia—
Isola di Stampalia : A. Martelli, 216 †
Standard books ; annotated and classified guide to best books in all departments of literature, 598 †
Stanford, E., Map showing proposed railways . . . affecting London, 474 † ; New Library Chart of World, 113 † New two-inch map of London and environs, 107 † ; Parliamentary map of London and environs, 107 †
Stanford, W., Bacon's "Citizen" Series Maps of London, 474 † ; remarks on "Relief in Cartography," 402
Stappers, L., Depth and Shore Deposits of Lake Tanganyika, 442
Statistics—
Géographie humaine comparée, Statistique Annuelle de, 1913 : J. Birot, 723 †
Stefani, G. : *see* Dainelli, G.
Stefanini, G., I bacini della Meduna e del Colvera in Friuli, 101 †
Stefánsson, V., Canadian Arctic Expedition, 85, 341, 447 ; My life with Eskimo, 220 †, 432 § ; Misconceptions about life in the Arctic, 220 †
Steffen, H., Chilean Hydrographical Surveys, 84
Stein, Sir A., Expedition in Central Asia 1913–1914..440
Stephenson, H. H., Who's Who in Science, 224 †
Sterneck, R. v., Zur Theorie der Gezeiten des Mittelmeeres, 598 †
Steuer, A., Ergebnisse der 7, Terminfahrt S. M. S. *Najade* in der Adria, 460 †
Stewart, C. A., Extent of Cordilleran ice-sheet, 468 †
Stockley, V. M., Big Game Shooting in India, Burma and Somaliland, 74 §
Stoll, H., Expedition to Spitsbergen in 1913..584
Strathcona, Lord, obituary, 346
Streams—
Original streams, and their rôle in general desert leveling : C. R. Keyes, 355 †
Streams, Taming of : G. W. Lamplugh, 651

Streitberg, T., République de Panama, 219 †
Strenger, F., Strabos Erdkunde von Libyen, 466 †
Stromboli—
Eruption, report on: F. A. Perret, 592 †
Strumpell, K., Forschungen am Nordrande des Kamerunplateaus, 716 †
Stuck, H., and H. P. Karstens, Ascent of Mount Denali (Mackinley), 83 §, 467 †, 717 †
Styria—
Historischen Geographie des Bachergebirges in Südsteiermark: P. Schlosser, 461 †
Sudan—
Cotton cultivation in Sudan, Recent progress, 103 †
Handbook for Travellers, Egypt and the Sudan: K. Baedeker, 216 †
Land settlement of the Gezira, Report on: H. Peacock, 103 †
Maps: Anglo-Egyptian Sudan (Survey Office, Khartum), 109 †, 476 †, 726 †; Egyptian Sudan (Geog. Section, General Staff), 109 †
Traditions historiques et légendaires du Soudan occidental: M. Delafosse, 716 †
Sudetes—
Maps: Wirtschaftskarte der Oesterr.-Sudetenländer: J. G. Rothaug und F. Thoms, 723 †
Suess, Ed., obituary, 701
Sumatra—
Indrapura or Korinchi, Mount, C. B. Kloss's expedition to, 694
Vulkaan G. Sĕkintjau in Benkoelen: H. Philippi, 103 †
Sunk lake, Antarctic, 623
Survey—
Altes und Neues von der Landesaufnahme: K. Korzer, 719 †
Determination of time, longitude, etc., W. Bowie, 222 †
Geographische Ortsbestimmung in sehr hohen Breiten: A. Wedemeyer, 470 †
Handbuch der Vermessungskunde: W Jordan and others, 596 †
Practical survey and elementary geodesy: H. Adams, 221 †
Surveying Apparatus for schools, Notes and directions for use of Philips' model set of: J. Fairgrieve, 105 †
Surveying Instrument—
Entwicklung des "Jakobsstabes": A. Schück, 719 †
Schwarzschildsche Libellensextant: J. Möller, 470 †
Sutton, J. R., Note on earthquake of South African tableland, 217 †
Sweden—
Bergslagsbygd: H. Nelson, 714 †
Hydrografiska Byrån: Årsbok, 3: för År 1911..213 †
Sweden—*continued.*
Kaledonischen Deckengebiets Schwedisch-Lapplands: W. von Seydlitz, 593 †
Luftcirkulationen i norra Sveriger Några ord om: A. Hamberg, 214 †
Meteorologiska forskningaresor i de svenska fjalltrakterna: J. W. Sandström, 214 †
Niederschläge in Schweden: J. v. Hann, 593 †
Swedish Expedition to Graham Land, 341
Switzerland—
Alpenstock; or sketches of Swiss scenery and manners, 1825–1826: C. J. Latrobe, 106 †
Faltenbogen der Zentral- und Ostschweiz: P. Arbenz, 710 †
Forestry in Switzerland: W. Dallimore, 335
Lakes of Zug and Egeri, Evaporation from: J. Maurer, 79
Landeskunde der Schweiz: H. Walser, 214 †, 682 §
Maps: Offizielle Eisenbahnkarte der Schweiz: Kümmerly and Frey, 475 †
Winter sports in Switzerland: E. F. Benson, 102 †
Sydow, E. von, Colouring methods on maps, 240
Syria—
Notes sur la Syrie: — de Torcy, 216 †
Szirtes, S.: *see* Rudolph, E.

T

Taal volcano, eruption of 1911..695
Tachibana,—, Expedition to Central Asia, 80
Tahiti—
Papeete Port d'escale et Dépôt de charbon, 718 †
Photograph of Captain Cook's observation mark at Matavi: B. G. Corney, 364 †
Quest and occupation of Tahiti by emissaries of Spain, 1772–1776: B. G. Corney, 596 †
Takla Makan desert, dunes of, 81
Talbot, P. A., and Mrs. Talbot, Catalogue of Plants collected in Oban District, Southern Nigeria, 466 †
Tanganyika, Lake—
Depth and Shore Deposits of Tanganyika: L. Stappers, 442
Gegenwärtiges und Zukünftiges vom Tanganyikasee: F. D. Karstedt, 716 †
Level of Lake Tanganyika, 443
Railway to Kigoma, Completion of, 339
Tapiro tribe, New Guinea, 269
Tarim basin, Desiccation in, 294:
Tarim Sehr glacier, 123, 125, 275, 286
Tarr, R. S., and L. Martin, Earthquake at Yakutat Bay, September, 1899.. 192 §; Glacial deposits of continental type in Alaska, 353 †

Taurus—
Bagdâdbahn im Taurus: W. Kossmann, 715 †
Taylor, F. B., Glacial and post-glacial lakes of Great Lakes region, 467 †
Taylor, G., Evolution of a Capital. A Physiographic Study of Foundation of Canberra, 378 *, 536 *; Relief map showing proposed Federal Capital Territory of Canberra, 478 †
Taylor, W. T., Engineering aspect of Panama Canal at present time, 1913.. 354 †
Temperature—
Temperaturdifferenz zwischen freier Atmosphäre und Berggipfeln: H. v. Ficker, 356 †
Ten Klooster, —, Explorations in Dutch New Guinea, 207
Teraba river, Nigeria-Kamerun boundary, 636
Teram Kangri, Karakoram, 126, 278
Terrestrial magnetism—
Cause of magnetic storms and origin of terrestrial magnetism: K. Birkelund, 471 †
Terrestrial relief—
Atlas of Forms of Terrestrial Relief, 210
Terrier, — Le, Determination of positions on Gabun, 443; Lacs du Bas-Ogooué, 103 †
Terry, T. P., Japanese Empire, including Korea and Formosa, 593 †
Tessier, L. F., Végétation des Alpes maritimes, 349 †
Tessmann, G., Die Pangwe, 217 †
Texas—
Southern Texas, Notes on semi-arid conditions in part of: T. O. Bosworth, 468 †
Thalbitzer, W., Ammassalik Eskimo, 719 †; Four skraeling words from Markland (Newfoundland) in Saga of Erik the Red, 224 †
Thames—
Upper Thames country and Severn-Avon Plain: N. E. MacMunn, 428 §
Thienemann, A., Bergbach des Sauerlandes, 591 †
Thirlmere, R., Theory of climatic cycles, 150
Thomas, N. W., Anthropological report on Edo-speaking peoples of Nigeria, 216 †
Thomasson, — de, Paix de Bucarest, 349 †
Thompson, J. S., China Revolutionized, 323 §
Thompson, R. C., New decipherment of Hittite Hieroglyphics, 216 †
Thonga tribe, South Africa, 324
Thorbecke, M. P., Auf der Savanne; Tagebuch einer Kamerunreise, 466 †
Thoroddsen, T., Polygonboden und "thufur" auf Island, 592 †
Thoulet, J., Notes de lithologie sous-marine, 222 †
Thurnwald, R., Durchquerung des Gebiets zwischen Kaiserin-Augustafluss und Küste, 718 †
Thurston, E., Madras Presidency, 215 †, 682 §
Thys, R., Scheme for regulation of Congo, 443
Tiahuanaco—
Ruinenstätte von Tiahuanaco, Beiträge zur Kenntnis der: J. Nestler, 468 †
Tibet—
Mission du Thibet, M. Desgodins et la, 350 †
Tibetan studies: A. Csoma de Körös and E. D. Ross, 216 †
Yunnan-Tibet Border, Journeys by F. Kingdon Ward, 578
Ticino—
Uebertiefung des Tessingebietes: O. Lehmann, 714 †
Tidal Lands, Use of Vegetation for reclaiming: G. O. Case, 105 †
Tierra del Fuego—
Fuégiens, leurs mœurs et leur langage au XVII^me Siècle: A. Roussel, 595 †
Tilby, A. W., English people overseas. South Africa, 1486-1913..594 †
Tilho, —, Explorations in Lake Chad Region, 441
Timbuktu—
Quand j'étais Maire de Tombouctou: L. Marc-Shrader, 103 †
Time—
Zeitkonferenz zu Paris, 1912, Ueber die internationale: E. Kohlschütter, 470 †
Tirol—
Ortsnamen in Welschtirol, Gebrauch deutscher: W. Rohmeder, 711 †
Titicaca—
Geographical sketch of Titicaca, island of the Sun: H. E. Gregory, 219 †
Titicaca island—
Geologic sketch of Titicaca island and adjoining areas: H. E. Gregory, 469 †
Togo—
Maps: Sechsherrenstockes: H. Gruner, 228 †
Regen- und Meerestemperatur-Messungen im Schutzgebiet Togo, 1912: M. Weiss, 594 †
Sechsherrenstocks, Begleitworte zur Karte des: H. Gruner, 466 †
Tong-i-tuk or Hark mountain, 669, 670
Tongking—
Frontière Tonkinoise: L. de Saint-André, 464 †
Torcy, — de, Notes sur la Syrie, 216 †
Toweik, Jebel, Arabia, 514
Tower, C., Treaty obligations of United States relating to Panama Canal, 354 †
Tower, W. S., Nitrate fields of Chile, 354 †
Town-planning, Ancient: F. Haverfield, 223 †, 334 §
Townsend, C. W., A short trip into Labrador peninsula by way of Natashquan river, 101 †

Trabucco, G., Sulla classificazione e sull' origine delle frane, 720 †
Transhumance, étude de géographie humaine: E. Fritsché, 722 †
Transvaal—
Geological Survey, Report for 1911. Union of South Africa, Mines Dept., 217 †
Maps: Africa, Sheet South, Heidelberg (Geog. Section, General Staff), 726 †; Krugersdorp (Geog. Section, General Staff), 477 †
Travel, Some Aspects of: Rudyard Kipling, 365 *
Tremearne, A. J., Hausa folk-tales, 594 †; Some Austral-African notes and anecdotes, 329 §
Trevor-Battye, A., Camping in Crete, 100 †, 323 §
Tripoli—
Campagne libiche della Missione Archeologica Italiana: S. Aurigemma, 717 †
Italy in North Africa: W. K. McClure, 328 §
Maps: Tripoli città e suoi dintorini (Istituto Geog. Militare), 477 †
Missione mineralogica italiana nella Tripolitania: I. Sanfilippo, 717 †
New Tripoli: E. Braun, 594 †
Spugne nella Libia, Pesca della, M. Sella, 217 †
Trolle, A., Danmark-Ekspeditionen til Grønlands Nordøstkyst. Hydrographical Observations, 195 §, 223 †
Tropics—
Bodenversetzung in den Tropen: W. Volz, 471 †
Granites, Fluting and pitting of, in the Tropics: J. C. Branner, 353 †
Trotha, —, v., Garnison Umgebungs-Karte von Massoko, 358 †
Trümpy, D., Zur Tektonik der unteren ostalpinen Decken Graubündens, 710 †
Tsang-po—
Expedition to, under F. M. Bailey and H. T. Morshead, 80
Exploration of Tsang-po, Note on: F. M. Bailey, 184 *
Tuamarina Valley: C. A. Cotton, 220 †
Tuapse, Black Sea port, 81
Tuckey, J. K., Account of voyage to establish a colony at Port Philip in Bass's Strait, New South Wales, 107 †
Tunis—
Maps: Carte de la Tunisie (Service Géog. de l'Armée), 229 †, 359 †, 477 †, 726 †
Tunisie moderne: R. Van Loo et A. C. Blancke, 594 †
Turfan—
Researches by Z. Tachibana in, 80
Turkey—
Asiatischen Turkei reist, Wie man in der: H. Grothe, 715 †
France et chemins de fer de l'Asia turque: R. Caix, 465 †
Turkey—*continued.*
Frontier between Bulgaria and Turkey, 559, 561
Turquie que l'on voit: L. de Launay, 102 †
Turquoise—
Notes on Turquois in the East: B. Laufer, 722 †
Tyrrell, J. B., Expedition to Hudson Bay, 444, 717 †

U.

Ubangi—
Hydrographical work, 204
Uganda—
Cotton industry of Uganda, 594 †
Forschungsreise durch Uganda, Meine: R. Kmunke, 594 †
Handbook of Uganda: H. R. Wallis, 217 †, 686 §
Quer durch Uganda: R. Kmunke, 217 †
Umlauft, F., Schulwandkartes, 725 †
Umpleby, J. B., Old erosion surface in Idaho, 468 †
United Kingdom (*see also* British Isles)—
Inland water transport: R. B. Dunwoody, 714 †
Insulæ Britannicæ; their geography, etc.: A. W. Whatmore, 214 †
Maps: Stanford's Geological Atlas of Great Britain and Ireland: H. B. Woodward, 473 †
Ordnance Survey: Account of methods and processes adopted for production of map, 107 †; Rectangular tangential projection of sphere and spheroid: Sir H. James, 107 †; Report of progress of, 215 †
Plants, Britannic, On buoyancy of seeds of some: R. L. Praeger, 593 †
Stonehenge and Turusachan, Plans and photographs of: Sir H. James, 107 †
Triangulation of United Kingdom, Investigation into accuracy: H. St. J. Winterbotham, 214 †
United States—
Climatic areas of United States as related to plant growth: B. E. Livingstone, 468 †
Colonizing activities of English Puritans: A. P. Newton, 594 †
Cotton Manufacturing Industry: M. T. Copeland, 433 §
Ethnology, American, Report of Bureau of, 218 †
Fishing Banks off our Atlantic Coast: G. C. Curtis, 218 †
Forestry, Master of, Degree of, 84
Forests in Atlantic Plain, Relation of, to humidity of Central States and Prairie region: R. Zon, 468 †
Geodesy, California-Washington arc of primary triangulation. Coast and Geodetic Survey, 468 †
Geographical Societies, First Joint Meeting, 696

United States—*continued.*
Ice-sheet, Cordilleran, Extent of: C. A. Stewart, 468 †
Juif Errant d'aujourdhui: L. Hersch, 196 §
Maps: Geologic Atlas (U.S. Geological Survey), 726 †; Rand, McNally's Indexed Pocket Maps, 111 †, 603 †, 727 †
Rainfall and temperature, Annual: G. A. Lindsay, 595 †
Washington and the West, being George Washington's Diary of September, 1784: A. B. Hulbert, 218 †
Unstead, J. F., and E. G. Taylor, Philips' Comparative Series of Wall Atlases, Africa, 108 †
Ural—
Platinseifengebiete von Iss- und Nischny-Tagil im Ural: N. Wissotzky, 213 †
Vom Ural bis Sachalin: O. Goebel, 351 †
Uruguay—
Observaciones meteorologicas in el Observatorio del Prado, Diez años de: L. Morandi, 219 †
Uruguay: G. Gassner, 596 †
Utah—
Geology . . . of San Francisco and adjacent districts: B. S. Butler, 468 †
Reconnaissance in Southern Wasatch Mountains, Utah: G. F. Loughlin, 595 †
U akwa tribe and river, New Guinea, 256, 259, 269

V.

Valence—
Site de Valence: M. D. Faucher, 711 †
Terrasses de plaine de Valence: M. D. Faucher, 711 †
Valenti, L., Sulla Variazione di salsedine nelle acque della laguna Veneta in rapporto con la Marea, 101 †
Vallaux, C., Archipel de la Manche, 323 §
Valleys—
Valli consequenti e subsequenti: G. Azzi, 721 †
Vallot, J., Vitesse des glaciers en hiver, etc., 222 †
Vancouver—
Vancouver. Pacific port of the Empire: F. B. Vrooman, 353 †
Vancouver Island—
Maps: Southerly portion of Vancouver island (Dept. of Lands), 478 †
Photographs of West Coast of Vancouver Island: H. C. Frind, 116 †
Van der Veen, A. L., Barents-Zee, 222 †
Van Loo, R., and A. C. Blancke, La Tunisie moderne, etc., 594 †
Vaughan, D. M., Etude géographique et historique sur la route du Lautaret, 711 †
Vegard, L., Influence du sol sur la glaciation au Spitsberg, 221 †
Venetia—
Carte annuali delle pioggie nella regione Veneta per il 1909 e 1910 (Ufficio Idrografico), 101 †
Variazione di salsedine nelle acque della laguna veneta in rapporto con la marea: L. Valenti, 101 †
Venezuela—
Boundary Arbitration, Venezuela and British Guiana: Sir G. R. Askwith, 106 †
Cientifica Exploradora del Oriente de Venezuela, Informe de la Comision, 219 †
Cordillera Venezolana de los Andes: A. Jahn, 219 †
Hora legal en Venezuela, 220 †
Mapa fisico y politico de Venezuela, Trabajos recientes del: J. M. Vivas, 469 †
Venezuelan question: W. L. Scruggs, 106 †
Venice—
Laguna di Venezia, Studi fitogeografici sulla: (R. Magistrato alle Acque), 350 †
Waterway between Milan and Venice: M. Beretta, 440
Vera Cruz—
Reptile-amphibian fauna in Southern Vera Cruz, Local distribution of: A. G. Ruthven, 217 †
Verbrugge, R., Confins sino-mongols, 714 †; Excursion en Mongolie, 350 †
Verbruggen, A., Nitrate de Soude du Chili, 219 †
Vesuvius—
Crater of Vesuvius, Descent into: F. Burlingham, 201
Victoria—
Geological Survey. Report of progress: R. B. Smyth, 107 †
Maps: Geodetic Survey of Victoria (Dept. of Lands and Survey), 112 †; Tourists' Maps (Dept. of Lands and Survey), 112 †; Victoria classified according to its productiveness (Dept. of Lands and Survey), 112 †; Victoria, showing Counties, Parishes and Railways (Dept. of Lands and Survey), 112 †
Vidal de la Blache, P., Caractères distinctifs de la geographie, 722 †
Vienna—
Boden der inneren Stadt Wien vor Seiner Besiedlung: A. Wallner, 461 †
Maps: Verkehrsplan der k.k. Reichshaupt und Residengstadt Wien: G. Freytag, 723 †
Vignaud, H., Thèses nouvelles sur l'origine de Christophe Colomb, 210 §, 224 †
Vilcabamba, Cordillera, Peru, 677
Villatte, —: *see* Schwartz, —
Vivas, J. M., Trabajos recientes del mapa fisico y politico de Venezuela, 469 †
Voeikof, A., Handel und Industrie im Europäischen Russland, 592 †

Voigt, A., Die Riviera, 213 †
Voigt, C., Neue Forschungen über Gross-Friedrichsburg, 716 †
Volcanoes—
Geschichtlich erste grundsätzliche Unterscheidung zwischen Schichtvulkanen und Quellkuppen : S. Günther, 722 †
Volcanic dust and other factors in production of climate changes, etc. : W. J. Humphreys, 341 §, 355 †, 471 †
Volcanoes and Climate : C. G. Abbot and F. E. Fowle, 222 †
Volz, W., Bodenversetzung in den Tropen, 471 †
Voss, J. C., Venturesome Voyages of, 599 †
Vrooman, F. B., Vancouver, Pacific port of the Empire, 353 †

W.

Wadai—
Maps : Carte du Ouadaï : — Largeau, 359 †
Wagner, H., Geschichte der Seemeile, 719 †
Wagner, M. L., Barbagia in Sardinia, 592 †
Waibel, L., Lebensformen und Lebensweise der Tierwelt im tropischen Afrika, 465 †
Walker, G. W., Modern Seismology, 355 †
Wallace, A. R., obituary of, 88
Walle, P., Bolivie et ses mines, 104 †
Wallis, B. C., Nottinghamshire in Nineteenth Century, 34 *
Wallis, H. R., Handbook of Uganda, 217 †, 686 §
Wallis island—
Annexion des Iles Wallis, 220 †
Iles Wallis : M. Guieysse, 470 †
Wallner, A., Boden der inneren Stadt, Wein vor seiner Besiedlung, 461 †
Walser, H., Landeskunde der Schweiz, 214 †, 682 §
Wanner, G., Topographische Skizze aus dem Ostarm der Insel Celebes, 601 †
Ward, F. K., Journeys on Yunnan-Tibet Border, 578
Ward, R. de C., on Climatic Changes in Central Africa, 298
Warigi, Papua, 409
Washington and the West, being George Washington's diary of September, 1784 : A. B. Hulbert, 218 †
Wasimwanza tribe, German East Africa, 82
Water—
Loss of water due to evaporation, etc. : G. Phillips, 355 †
Wauters, A. J., Notre politique de chemins de fer au Congo et la voie de l'Urua, 351 †
Waves—
Sand and snow, Waves of, and the eddies which make them : V. Cornish, 355 †
Weber, H. E., Lantern slides of Mesopotamia, 231 †
Wedderburn, E. M., Temperature observations in Loch Earn, 214 †
Wedemeyer, A., Geographische Ortsbestimmung in sehr hohen Breiten, 470 †
Weeks, J. H., Among the primitive Bakongo, 593 †
Wegemann, G., Gezeiten des Mittelmeeres, 597 † ; Lakes of diluvial deposits of Schleswig, 439 ; Schleswigschen Diluvialseen und ihre Kryptodepressionen, 439 §, 592 †
Wegener, K. (*see also* Hergesell, H.), "Guipa" Höhle in der Crossbai Spitzbergens, 470 †
Wegner, T., Erdfall bei Hopsten vom 14 April 1913..591 †
Weiss, M., Regen- und Meerestemperatur-Messungen im Schutzgebiet Togo, 1912..594 †
Wellcome Photographic Exposure Record and Diary, 1913..225 † ; Ditto, 1914..599 †
Westarp, Graf v., Routenaufnahmen in Armenien und Kurdistan, 715 †
West Indies—
Water-colour sketches made on voyage to and from West Indies : F. Alcock, 116 †
Weston, S. C., and F. V. Longstaff, Topographical Map of Alberni, British Columbia, 602 †
Westralia, Lake System of : J. W. Gregory, 656 *
Westropp, M. S. D., Notes on pottery manufacture in Ireland, 214 †
Wetherill, H. B., World and its discovery. Oxford Geographies, 599 †
Weyermann, —, Explorations in Dutch New Guinea, 207
Whatmore, A. W., Insulæ Britannicæ, 214 †
Whitbeck, R. H., Geography and industries of Wisconsin, 595 † ; Industries of Wisconsin and their geographic basis, 218 †
White, W., Journal of a voyage performed in the *Lion* Extra India-man from Madras to Colombo and Da Lagoa Bay, 107 †
Whitlock, Major, remarks on "Geographical Results of Niger-Kamerun Boundary Commission," 649
Who's Who in Science : H. H. Stephenson, 224 †
Wichmann, H., Annexion von Ada-Kaleh durch Oesterreich-Ungarn, 461 †
Wigram, L. E., appointment as Principal of Livingstone College, 700
Wilczek, Count, Plan einer österreichischen Südpolarexpedition, 596 †
Wilhelm, M., Project for Regulation of the Durance river, 78
Wilhelmina, Mount, Dutch New Guinea, 207

Willcocks, Sir W., and J. I. Craig, Egyptian Irrigation, 216 †, 573 §
Williamson, J. A., Maritime enterprise, 1485–1558 .. 224 †
Williamson, R. W., Ways of South Sea Savage, 596 †
Wilson, E. H., Naturalist in Western China, 351 †
Winamwanga tribe, German East Africa, 588
Winterbotham, H. St. J., Investigation into the accuracy of the Triangulation of the United Kingdom, 214 †
Wisconsin—
Geography and industries of Wisconsin: R. H. Whitbeck, 595 †
Industries of Wisconsin and their geographic basis: R. H. Whitbeck, 218 †
Maps: Indexed County and Township Pocket Map of Wisconsin: Rand, McNally & Co., 727 †
Wissotzky, N., Platinseifengebiete von Iss- und Nischny-Tagil im Ural, 213 †
Wittensee lake, Schleswig, 439
Wittich, E., Apuntes relativos al censo verificado en la Republica Mexicana en Octubre de 1910 .. 467 †
Wollaston, A. F. R., An expedition to Dutch New Guinea, 248 *, 698; award to, 690; and C. B. Kloss, Photographs of Dutch New Guinea, 729 †
Woodford, C. M., The Loss of La Pérouse, 581
Woodward, H. B., Stanford's Geological Atlas of Great Britain and Ireland, 473 †
Worcester, Dean C., Non-Christian peoples of Philippine Islands, 715 †
Workman, F. B., Exploration of Siachen or Rose Glacier, Eastern Karakoram, 117 *
Workman, W. H., Features of Karakoram glaciers connected with pressure, etc., 715 †; letter on Altitude Insomnia, 97; Physical characteristics of Siachen Basin and Glacier System, 273 *
World—
Carte Internationale du Monde au Millionème, 178
Desiccation, Reported, of the World and its Effects, 148
Land Map of World on new Projection: B. J. S. Cahill, 86 §, 221 †
Maps: Comparative Atlas, Physical and Political: J. G. Bartholomew, 361 †; Erdkarte in Mittabstandstreuer Azimutalprojektion: E. Rudolph und S. Szirtes, 603 †; International Map of World (Instituto Geo. Militar, Buenos Aires), 113 †; Naturlichen Vegetations- u. Wirtschaftsgebiete der Erde; J. G. und R. Bothaug, 727 †; Oxford Wall Maps: The World: A. J. Herbertson, 361 †; Stanford's New Library Chart of the World, 113 †; Vaterländischer Geographischer Schulatlas: J. G. Rothaug, 727 †; Verbreitung der Wildschafe: R. Kowarzik, 603 †
Oxford Geographies. World and its discovery: H. B. Wetherill, 599 †
World—*continued.*
Woshm district, Arabia, 513, 514
Wright, C. S., remarks on "Antarctica and some of its problems," 628
Wright, C. T. H., and C. J. Purnell, Catalogue of London Library, 598 †
Wunstorf, W., Ueber Löss und Schotterlehm im Niederrheinischen Tiefland, 714 †
Wutai Shan—
Durchwanderung der Wutaischanketten: W. Limpricht, 464 †

Y.

Yakutat Bay, Earthquake at, September, 1899: R. S. Tarr and L. Martin, 192 §
Yale University and National Geographic Society Peruvian Expedition: H. Bingham, 676
Yar-khoto, ruins at, 80
Yellow river: *see* Hwang-ho
Yemen—
Mission d'études au Yemen: A. Beneyton, 715 †
Railway surveys, 66
Yenisei river, navigation, 482
Yorke, W., Relationship of Big Game of Africa to spread of Sleeping Sickness, 715 †
Yorkshire—
Maps: Official Railway Map of Yorkshire District (Railway Clearing House), 600 †
Moorlands of North-Eastern Yorkshire: F. Elgee, 321 §
Young, A., Tidal phenomena at inland boreholes near Cradock, South Africa, 82
Younghusband, Sir F., remarks on "Exploration of Siachen or Rose Glacier," 142
Yule, Sir H., Cathay and the way thither, edited by H. Cordier, 350 †
Yunnan—
Au Yunnan et dans le massif du Kinho: A. F. Legendre, 215 †
Journey on Yunnan-Tibet Border by F. Kingdon Ward, 578

Z.

Zambezia—
Wild game in Zambezia: R. C. F. Maugham, 466 †
Zigeï—
Subdivision de Zigueï, Notice sur la: A. M. Peignot, 103 †
Zimba tribe, Africa, 95
Zon, R., Forests and water in light of scientific investigation, 720 †; Relation

of forests in Atlantic Plain to humidity of Central States and Prairie region, 468 †
Zoogeography —
Oekologischen Grundlagen der Tierverbreitung: R. Hesse, 598 †
Zubeir Pasha—
Black ivory and white, or story of El Zubeir Pasha: H. C. Jackson, 224 †, 431 §
Zug, Lake, Evaporation from: J. Maurer, 79
Zugmayer, E., Balutschistan, 714 †; Photographs of Baluchistan, 728 †
Zulu—
Grammar of Sindebele dialect of Zulu: J. O'Neil, 217 †
Zumperi tribe, Nigeria, 639
Zungeru, Harmattan Wind at, 339

INDEX TO MAPS.

EUROPE.

Balkan States, showing Frontiers in accordance with Treaties of 1913–1914 .. 604
Nottinghamshire in the Nineteenth Century, Sketch-maps illustrating, 35–55

ASIA.

Arabia, Northern, Sketch-map to illustrate journey by G. Leachman, 604
Euphrates River, Sketch-map of area affected by Hindie Barrage, 416; Hindie Barrage, 417
Indo-Russian Triangulation Connection, Sketch-map to illustrate paper by K. Mason, 667
Myitkyina to Sadiya, Sketch-map showing route followed by B. S. A. Pritchard from, 525
Siachen or Rose Glacier and tributaries in Eastern Karakoram explored by F. B. Workman Expedition, 232
Siberia, Sea Route to, Sketch-map to illustrate papers by F. Nansen and J. Lied, 604
Tsang-po Falls, Sketch-map showing F. M. Bailey's Route to, 185
Yemen, Sketch-map showing Railway Surveys in, 67

AFRICA.

Nigeria-Kamerun Boundary Commission of 1912–13, Map to illustrate paper on: W. V. Nugent, 730

ANTARCTIC.

Antarctic, British Expedition. Sketch-map showing work of Northern Party: R. E. Priestley, 116
Antarctica—
  Magnetic stations, Sketch-map showing, 613
  Probable Petrographic Zone of Andes and Possible Fracture Virgation of Andean Zone to join Antarctic Horst, Sketch-map, 607
  Ross barrier, Sketch-map, showing Glacier ribs, 618
  South Polar Regions, showing proposed routes of Trans-Antarctic Expedition, 1914 .. 175

AUSTRALASIA.

Australia—
  Federal Territory: G. Taylor, 480
  Sketch-maps illustrating the "Evolution of a Capital," 379–394, 538–548
New Guinea, Dutch, Sketch-map to illustrate explorations by A. F. R. Wollaston, 364, 698
New Guinea, Western Papua, Sketch-map showing Mr. Beaver's routes in Girara district, 480
Westralia, Lake System of, Sketch-map to illustrate paper on: J. W. Gregory, 730

GENERAL.

World, Sketch-maps to illustrate paper Is the Earth drying up?" by J. W. Gregory, 232

ILLUSTRATIONS AND DIAGRAMS

ASIA.

Arabia, Central—
Boreida, 507.
El Mudnaib, 507
Great mosque and typical Wahabi minaret, Riadh, 513
Hazil, Wells of, 506
Jebel Toweik, 512
Kusaiba in Kasim, 506
Palace slaves in Riadh, 513
Riadh from south, 512
Indo-Russian Triangulation Connection—
Kilik East H. S., 669
Kilik West H. S., View south from, 669
Pasu and Hunza gorge, with mountains of Shoonuk, 668
Rakaposhi from near Tashot, Hunza or Dumani, 668
Myitkyina to Sadiya, Journey from—
Chengaw range, Top of, 522
Conical peaks at confluence of N'mai and A'mekh, 526
Kachins at Kumku, 532
Naingvaw grave, Type of, 523
Nam Hkamti river, On banks of, 530
Shan women of Hkamti, 531
View up pass between two conical peaks at confluence of N'mai and A'mekh, 527
Siachen basin and glacier system—
Bird's-eye view of 48 kilometres of trunk of Siachen glacier, 277
Black slate hillock moraine, 277
Camp at about 3800 metres, on grey limestone moraine at base of boulder, 284
Cloud from avalanche . . . on Bilaphond glacier, 285
Converging black and grey moraine streams, 276
Siachen Basin and Glacier System—*contd.*
End of rock-promontory projecting into edge of peak, 284
Gigantic seracs and passage between them on Siachen, 276
Pressure seracs, Line of, sharpened off by melting into pointed pinnacles on
Pyramidal ice-pinnacles, 277
Tarim Shehr glacier, 285
Siachen, or Rose Glacier—
Gusherbrums, the source of north-east Kondus glacier, 124
Indira col, or water-parting at north source of Rose glacier, 117
Peak 8, taken from Junction peak, 133
Peaks 35 and 36 and ridge separating Dong Dong glacier from Peak 36 glacier, 125
Sia La, On the, Bride peak in background, 133
Silver Throne plateau, View taken from, 124
Tarim Shehr promontory, taken from 18,400 feet, 132
Tawiz peak summit, 125
Teram Kangri from west side of Rose glacier, 124
Turkestan La or north-east Siachen water-parting, On the, 132
Siberia, Sea-route to—
Caravan of steamers, 680 miles from Mouth of Yenisei, 485
Cliff between Krasnoyarsk and Minussinsk, 484
Forest on Yenisei, north of Krasnoyarsk, 484
Minussinsk, 485
Siberian types, 484
Tundra, mouth of Yenisei, 485

AFRICA.

Nigeria-Kamerun Boundary Commission—
Boundary post, Putting in a, 642
Dakka pagans, 643
Juju house and secret grain store, 637
Mahana river, 642
Nigeria-Kamerun Boundary Commission—*continued.*
Mauchi girl, 643
Needle peak, Katsena valley, 636
Typical hill, 636
Zumberi hills, View in, 637

AUSTRALASIA.

Australia : Evolution of a Capital—
"Acton," old homestead which forms centre of Capital site, 381
Cotter gorge where water-supply dam is being built, 388
Federal Capital site, 1913..380
Federal settlement, First, on slopes of Mount Mugga, survey camp, 1910.. 380
Granite tor on Castle hill near Tharwa, 385
Molonglo river, which flows through site of city, 381
Murrumbidee gorge cutting through the Tharwa, 385
Murrumbidgee river, 384
Relief model of Federal Capital, 388
Typical rough country in south-west territory, 384
Girara district, Papua—
Girara man in dancing costume, 411
Girara men and women, Types of, 410
Prow of carved Girara ceremonial canoe, 410
Veiled Girara woman with fishing-pot, 411
New Guinea, Dutch—
Carstensz, Mount, from south, 252
Ice above cliffs of Mount Carstensz, 257
Icefall of Carstensz glacier 257
Leonard Darwin, Mount, from south-east, 252
Mountain men and women, 260, 261
Native hut in mountains, 253
Utakwa, Valley of, 253, 256
Utakwa valley, View down the, from Mount Carstensz, 256

POLAR REGIONS.

Antarctica—
Comparative sections showing thickness of ice in relation to relief of land, 612
Diagrammatic sections across West and East Antarctica, 624
Nansen barrier, Section across, 614
Ross barrier, Section across, east to west, 621
Sunk lake, Section across, 623
Northern party of Captain Scott's Expedition—
After the winter at Inexpressible island, 5
Boulders hurled many yards up sloping beach by waves, 8
Northern party of Captain Scott's Expedition—*continued*.
Campbell testing his improved model of sledge-boat, 4
Fossil wood from Priestley glacier, 9
Speed trials of the Adélie at Cape Adare, 4
Surf breaking on north beach at Cape Adare, 8
Spitsbergen—
Glacier at foot of Kjellström, 585
Group of peaks south of the col, looking east, 584
Kjellström valley, Upper, 585
Plateau between Agardh bay and Advent valley, 584

GENERAL.

Projection, A new, one arrangement of Mr. Cahill's projection, 86

END OF VOL. XLIII.

PRINTED BY WILLIAM CLOWES AND SONS, LIMITED, LONDON AND BECCLES.